

JOSEPH NEEDHAM

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PART IV: TRADITIONAL BOTANY: AN
ETHNOBOTANICAL APPROACH

BY

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This book is dedicated to

JACQUES GERNET

Professor, Collège de France,
who founded the first research team in France for the history of
science and technology in China,

and

YAMADA KEIJI 山田慶児

Professor, Kyoto University.

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who invited me to write this book.

Quelque diversité d'herbes qu'il y ait, tout s'enveloppe sous le nom de salade.

Michel de Montaigne (1580),
Essais, Livre I Chapitre XLVI, p. 265.
Gallimard, Paris, 1962.

*What variety of herbs soever are shufed together in the dish,
yet the whole mass is swallowed up under one name of a sallet.*

Tr. Charles Cotton 1685, ed.
William Carew Hazlitt, p. 367.
Reeves and Turner, London, 1877.

et, passant par quelques prés ou aultres lieux herbuz, visitoient les arbres et plantes, les conférons avec les livres des anciens qui en ont escript, comme Théophraste, Dioscorides, Marinus, Pline, Nicander, Macer et Galen, et en emportoient leurs pleines mains au logis, desquelles avoit la charge un jeune paige, nommé Rhizotome, ensemble des ... pioches, ... bêches et aultres instruments requis à bien arborizer.

Rabelais (1539),
Gargantua, Chapter xxiii, pp. 74–5,
Gallimard, Paris, 1955.

and passing through certain meadows, or other grassy places, beheld the trees and plants, comparing them with what is written of them in the books of the ancients, such as Theophrast, Dioscorides, Marinus, Pliny, Nicander, Macer, and Galen, and carried home to the house great handfuls of them, whereof a young page called Rizotomos had charge; together with ... pickaxes, ... pruning-knives, and other instruments requisite for herborizing.

Tr. Sir Thomas Urquhart of Cromarty, 1653,
pp. 72–3, A. H. Bullen,
London 1904.

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ABBREVIATIONS

<i>APS:</i>	<i>Acta Phytotaxonomica Sinica</i>
<i>ARLC/DO:</i>	<i>Annual Reports of the Librarian of Congress (Division of Orientalia)</i>
<i>B.E.F.E.O.:</i>	<i>Bulletin de l'École française d'Extrême-Orient</i>
<i>BMFEA:</i>	<i>Bulletin of Museum of Far Eastern Antiquities</i> (Stockholm)
<i>CBOT:</i>	<i>Chronica Botanica</i>
<i>ECB:</i>	<i>Economic Botany</i>
<i>FMNHP/AS:</i>	<i>Field Museum of Natural History</i> (Chicago) <i>Publications; Anthropological Series</i>
<i>HJAS:</i>	<i>Harvard Journal of Asiatic Studies</i>
<i>JAHIST:</i>	<i>Journal of Asian History</i> (International)
<i>JATBA:</i>	<i>Journal d'agriculture traditionnelle et de botanique appliquée</i>
<i>JLS (B):</i>	<i>Journal of the Linnean Society, Bot. Sect.</i>
<i>JRAS/CB (N.S.):</i>	<i>Journal of the China Branch of the Royal Asiatic Society</i>
<i>JRAS/NCB (N.S.):</i>	<i>Journal of the North China Branch of the Royal Asiatic Society</i>
<i>MCHSAMUC:</i>	<i>Mémoires concernant l'histoire, les sciences, les arts, les mœurs et les usages des chinois, par les Missionnaires de Pékin</i> (Paris, 1776–89), 14 vols.
<i>S.E.¿E.B.:</i>	<i>Société d'ethnozoologie et d'ethnobotanique</i>
<i>TAPS:</i>	<i>Transactions of the American Philosophical Society</i>
<i>TAS/¿:</i>	<i>Transactions of the Asiatic Society of Japan</i>
<i>TP:</i>	<i>Toung P'ao</i>

SERIES EDITOR'S PREFACE

Any reader of Georges Métaillé's book will quickly appreciate its great scholarly value, and will no doubt sense how much sheer labour and learning its completion must have demanded from its author. Its publication is a key moment in several fields of scholarship. How does a book like this come to be? Like many volumes of *Science and Civilisation in China* (SCC), this one has a story behind it. But even in the context of the long story of SCC, its story is one of the longer ones, indeed perhaps the longest.

In my Series Editor's Preface to Volume 5, Part XI, *Ferrous Metallurgy*, I began by looking back at the plan of Joseph Needham's great project that was set out in Volume 1 of the series, *Introductory Orientations*, published in 1954. In tracing the history of the present volume, I shall follow a similar course. To judge from the 1954 plan, Needham had not then begun to think in detail about what he was to write on the subject of plants in China. If we look at the outline given for Volume 6, *Biology, Agriculture and Medicine*, we see:

[Section] 38 BOTANY¹

Botany and plant sciences in the great series of pharmaceutical compendia

Development of the classification system

Special monographs in the Sung

Discovery of sex in plants; plant abnormalities, etc.

The whole of Volume 6 as planned in 1954 was to be contained in a single book, covering Sections 38 to 45 – Botany, Zoology, Biochemical Technology, Agriculture, Agricultural Arts, the 'Institutes of Medicine' (specified as Anatomy, Physiology and Embryology), Medicine, and Pharmaceutics. In terms of space in the plan, Botany represented about one-twelfth of the whole. Even supposing that Volume 6 was to be as long as Volume 3, which was made up of an impressive 680 pages of main text, that would have given Botany a little under sixty pages.

But, as readers of SCC will be aware, almost as soon as the series got under way, it became clear that two tendencies were leading the series beyond the limitations of the original plan. One was the tendency towards 'benign inflation' of the SCC series in the hands of Needham himself. Volumes 1, 2 and 3 appeared as three single physical books, but the sheer quantity of material that Needham produced as his research and writing gathered momentum dictated that Volume 4 should be split

¹ The 1954 plan divided the topics of the work into fifty numbered sections, from 'Preface' to 'General Conclusions'. This numbering has been largely preserved within the volumes and parts of the series over the more than sixty years of its subsequent publication.

into three parts, a division for which Needham gave the following explanation in 1962:

in ready response to the critics who found Vol. 3 too heavy and bulky for comfortable meditative evening reading, the University Press has decided to produce the present volume in three physically separate parts, each being as usual independent and complete in itself.
(Volume 4, Part I, xxviii)

Thus began the process that Needham himself described by distinguishing the seven 'heavenly volumes' of the original plan, which continued to define the basic structure of the series, from the increasingly numerous 'earthly volumes' produced as each heavenly volume split into separate physical parts.

The second tendency resulted from the recruitment of collaborators who wrote major portions of text themselves, rather than simply helping Needham with his own writing, whether as research assistants or as collaborators who worked with him on more equal terms. The first collaborator to produce a major section of independent text was Kenneth Robinson, who wrote the section on acoustics for Volume 4, Part I. But it soon became understood that Francesca Bray's contribution would constitute an 'earthly volume' in itself; her work eventually appeared in 1984 as Volume 6, Part II, *Agriculture*. This was to set the pattern to be followed by most subsequent collaborators, as we shall see. Every scholar would, after all, prefer his or her work to appear as a complete book on its own, rather than as a mere part of somebody else's book.

Meanwhile, twenty-five years after the first outline of the series in 1954, a new 'State of the Project' was published in pamphlet form in 1979 for private circulation amongst collaborators and supporters of the project. By then the following eight 'earthly volumes' of the series had appeared in print:

- Volume 1. *Introductory Orientations*. Joseph Needham, with the research assistance of Wang Ling (1954)
- Volume 2. *History of Scientific Thought*. Joseph Needham, with the research assistance of Wang Ling (1956)
- Volume 3. *Mathematics and the Sciences of the Heavens and Earth*. Joseph Needham, with the research assistance of Wang Ling (1959)
- Volume 4. *Physics and Physical Technology*
 - Part I. *Physics*. Joseph Needham, with the research assistance of Wang Ling, and the special co-operation of Kenneth Robinson (1962)
 - Part II. *Mechanical Engineering*. Joseph Needham, with the collaboration of Wang Ling (1965)
 - Part III. *Civil Engineering and Nautics*. Joseph Needham, with the collaboration of Wang Ling and Lu Gwei-djen (1971)
- Volume 5. *Chemistry and Chemical Technology*
 - Part II. *Spagyric Discovery and Invention: Magisteries of Gold and Immortality*. Joseph Needham, with the collaboration of Lu Gwei-djen (1974)

Part III. *Spagyric Discovery and Invention: Historical Survey, from Cinnabar Elixirs to Synthetic Insulin*. Joseph Needham, with the collaboration of Ho Ping-Yu [Ho Peng-Yoke] and Lu Gwei-djen (1976)

If we look at the plans for botany published in the 1979 pamphlet, it is clear that there had been great developments during the preceding quarter of a century. Volume 6, of which Section 38, 'Botany', had originally been described in four lines, was now planned to appear in four parts, with Sections 38 to 42 composing Parts I and II, while Sections 43 to 45, dealing with medical matters, were to be dealt with in Parts III and IV. The plan for Section 38 occupied more than sixty lines in the pamphlet plan, and much of it had in fact already been drafted. It is at this point that the name of Georges Métaillé first appeared in print in association with *Science and Civilisation in China*: under the heading for Parts I and II in the pamphlet, we read 'With the collaboration of Lu Gwei-djen, Georges Métaillé, and Francesca Bray'.

How did this come about? It appears that towards the end of the 1970s, Needham and Lu Gwei-Djen (both of whom, it must be recalled, were by then well into their eighth decade of life) felt that they needed to free themselves of further work on the unfinished Section 38, so that they could spend more time on the topic of medicine – presumably with the immediate aim of finishing the history of acupuncture and moxibustion that was eventually published by Cambridge University Press, separately from SCC, under the title *Celestial Lancets* in 1980. But a substantial part of the intended book on botany remained unfinished.

To trace the background of this story, we may turn to the correspondence files of the SCC project, carefully archived at the Needham Research Institute. Inside a green folder, labelled 'SCC VI Bot.', we find another folder bearing the name 'Georges Métaillé'. The earliest slip of paper in that folder is dated '16 Dec 78' in Needham's careful handwriting, with a box round the words 'BOTANY Section, finishing of'. Clipped to that slip is the curriculum vitae of a young French researcher in his thirties, who describes himself as being in the process of completing a *doctorat d'état* on the history of botanical vocabulary in China and Japan in the 19th century, having completed a PhD in 1974. Ever mindful of the need for economy in husbanding the small funds available for the project, Needham noted with evident satisfaction 'when in Paris: won't need salary – it comes from CNRS because the work is in his own line anyway'. Plans for an initial visit to Cambridge in the first six or seven months of 1979 are outlined, concluding with note that once the work was under way the new colleague 'could work in Paris, + xeroxed files of notes, coming once or twice for coupla [sic] weeks'.

So in March 1979 arrangements for financing the new collaborator were put in place by Peter Burbidge, then chairman of the East Asian History of Science Trust, and (we may presume) Needham and Lu Gwei-djen turned with relief to non-botanical matters. Meanwhile, Georges Métaillé contemplated his stack of xeroxed material from Cambridge, and began to plan his own writing.

But as time went by it became clear that, like all tasks to do with *SCC*, this one was less simple to complete than might have appeared at first sight. On the one hand, the tasks that Needham passed on to others were almost by definition those that he did not feel able or willing to cover himself – which often meant that the topics and the evidence relating to them might conceal considerable difficulties behind the few lines devoted to them in the series plan. On the other hand, except in rare cases most collaborators were obliged to work for *SCC* while filling posts elsewhere that also required other duties of them, which might demand a pace of publication for tenure or promotion that was much more rapid than *SCC* allowed. In Métaillié's case, there was an official French mission to China to be undertaken in the short term, with few opportunities to work on *SCC*-related topics, and also a major project for a dictionary of agriculture that was eventually to be published in 1995.² This project involved Métaillié working with and managing a number of collaborators of his own.

In March 1981, when writing in reference to an impending visit to Cambridge by Métaillié, Needham added a significant sentence: 'We are longing for [the volume on botany] to be able to go to press, and I must say that the CUP themselves are trying to hasten more the publication of the volumes, so that they are very eager to receive typescript'. Reference is also made in this letter to the contribution to be made to the book by Huang Hsing-Tsung (Huang Xingzong, once Needham's secretary in wartime China, but by 1981 working with the National Science Foundation in Washington), who had been given responsibility for the parts of Section 38 dealing with biological plant protection. Further correspondence renews the topic, until in February 1983 Needham announces that those portions of the botany volume to hand, including most of the contribution by Huang Hsing-Tsung, have gone to press, and galley proofs are imminently expected. In April of that year, Needham writes, 'I think it is now agreed that we should print the breakdown of all the sub-sections of the chapter in Vol. vi, part 1, leaving your remaining portion to come in a later volume'.³

SCC volumes passed rather more slowly through the press in those days, and in the event Volume 6, Part 1, containing 553 pages of main text, did not actually appear until 1986, thirty-two years after the original plan of 1954. When readers turned to the contents pages, they found that Section 38 had been divided into

² Georges Métaillié and Cai Shenglin (1995). *Dictionnaire d'agriculture chinois-français-anglais*. London, New York & Paris.

³ Needham seemed quite happy with the idea that collaborators' contributions that were not ready to be published with his own work, such as Métaillié's, could be fitted in somewhere at a later stage, perhaps by making up 'a volume consisting of various contributions' (letter from Needham to Métaillié dated 14 June 1982). Consistency of topic was not necessarily a primary consideration in such plans. Needham had, for instance, hoped that material drafted by Lo Jung-Pang on deep drilling and the salt industry might find a place in Francesca Bray's book on *Agriculture*, to which it would not have been very relevant. See Volume 6, Part 1, Preface, xxiv–xxv, and the letter referred to above. Of course the topic of the salt industry (Section 37) properly belonged in some part of Volume 5 (*Chemistry and Chemical Technology*) rather than anywhere in Volume 6 (*Biology and Biological Technology*).

alphabetically divided subsections labelled (a) to (k). Subsections (a) to (d) were by Needham and Lu Gwei-djen, and comprised:⁴

- (a) Introduction,
- (b) The setting: China's plant geography,
- (c) Botanical linguistics,
- (d) The literature and its context.

Huang Hsing-Tsung was responsible for

- (e) Plants and animals in man's service.

After the usual details of bibliographies, the index, and auxiliary tables, there is a white space, followed by these words enclosed by rules: 'The following subsections, by Georges Métaillé, are not yet ready for publication', after which the subsections still to come are listed as:

- (f) Treatises on traditional botany, and the development of classification,
- (g) The development of plant description and illustration,
- (h) Chinese knowledge of the life of plants,
- (i) Horticulture and its techniques,
- (j) The influence of Chinese flora and botany on modern plant science,
- (k) Conclusions.

In his preface, Needham wrote,

The present volume contains most of section 28 [*sic* – an uncorrected typographical error for 38], on the plant sciences. We cannot say all, because there will still be more to come in a following volume, the work of our collaborator Dr Georges Métaillé . . . It would no doubt have been preferable to bring it all out together in one volume, but the necessities of collaboration and the interlocking of commitments have made it impossible.

The (somewhat truncated) botany volume joined its sister volumes on the shelves of scholarly libraries worldwide. Then, in May 1987, Professor D. A. Griffiths wrote to Cambridge University Press from Hong Kong, enquiring when 'the continuation volume' containing Métaillé's material would be published. In July of that year, Colin Ronan (at the time secretary of the East Asian History of Science Trust) wrote back to Professor Griffiths referring to Métaillé's work as planned to appear in 'the second botany volume' of *SCC*. It is clear that those working with Needham had tacitly moved from the original notion of the remaining botanical material finding a place in some later volume of the series, to the assumption that there would be a completely independent further volume on botany, written by Métaillé. By April 1988 it was clear that the issue had been settled in favour of a separate

⁴ I omit here and below the more detailed analyses of the content of each subsection given in the original.

'earthly volume', and Métaillé gave as his estimate that the typescript for this new volume would consist of around 400 pages.

Time (once more) passed. In 1992 I became deputy director of the Needham Research Institute (NRI) in parallel with my full-time job in the Department of History at the School of Oriental and African Studies in London. I worked under the new director of the NRI, Professor Ho Peng Yoke, who had taken over in 1990 when Needham finally thought it wise to retire. I also, at Professor Ho's request, became chairman of the Publications Board, and general editor of the *SCC* series. When I reviewed the considerable number of *SCC* volumes still to come but not yet completed, the book by Georges Métaillé was one of those on my preliminary list. I was a little concerned to learn that there was an understanding between Needham and the author that the text of this volume would be drafted in French, but I dealt with this problem as far as I could by earmarking funds for the eventual employment of an expert translator, whose skills would obviously be required in order for the book to be published in English with the rest of the series.

Work on the series continued over the next two decades, for part of which (after 2002) I held the office of director of the Needham Research Institute. Nine further (earthly) volumes were published under my general editorship. Finally, in February 2011, I was able to report to the Needham Research Institute Board of Trustees,

We [have] received the final instalment of MS from [Georges Métaillé], and have now been sent very favourable reports from the two specialist readers. We therefore begin the complex process of preparing this long-awaited volume for publication, a task which we view with all the more satisfaction considering how long the author has been working on this major project.

But, as already mentioned, Métaillé's complex and scholarly text was all in French. However, I was in the extremely fortunate position of having by then agreed with Lady Lloyd (Janet 'Ji' Lloyd) that she would take on the very demanding task of translation. As anyone familiar with the range of scholarly work that had already been handled by this expert and sensitive translator will understand, I felt complete assurance that the resulting version would be the best that could possibly be produced. Readers of the translated book will surely agree that my assurance was justified in the event. I leave it to the reader to imagine the work that was needed to accomplish the immense task of translation, and the sheer courage and persistence that must have been required to confront each successive list of technical terms and plant names, all of which demanded a precise English equivalent. But the job was done: by May 2012 it was half-finished, and in late 2013 we had before us a fully translated text, agreed with the author, and could begin to carry out the final tasks required before sending the book to press.⁵ So, thirty-six years after Georges

⁵ These included, amongst other things, securing the complex copyright permissions required for the book's many illustrations. Much gratitude is due to the institute's librarian, John Moffett, for his persistence and skill in helping to ensure that all that was needed was eventually put in place.

Métailié agreed to Needham's request to help finish his book on botany, here is the result.

The author himself can be left to outline the significance of his work, which he does very clearly in his own preface. But a few words of comment from the point of view of the whole series may be appropriate here. First, in addition to being a major contribution to its field, this book is in one way a major departure in the context of the *SCC* series. For, while its structure follows almost exactly the subsection headings 38 (f) to 38 (k) as laid down by Needham, it introduces a new element to the series – that of conscious reflexivity and a consequent realignment of research strategy. The key, I think, is found in these words of Métailié in the introduction:

In accepting the proposal made by Joseph Needham and Lu Gwei-djen, I had in effect accepted the idea that a form of clearly defined botany did exist in ancient China, given the voluminous corpus of texts to be analysed. However, as my reading proceeded, I was forced to admit, in the first place, that I had come across no Chinese term that might have even one of the modern meanings of 'botany'. Furthermore, nor had I found any term that referred to any traditional knowledge specifically about plants before the creation, in 1858, of the term *zhiwuxue* 植物學, meaning botany in the modern sense of the term. Finally, among the abundant literature that I was working through, there was no text that could be regarded as a kind of botanical manual, nor was there any reference to what we call a flora. So was there no botany in China at that time?

To ask such a question is, in effect, to turn the spotlight on what has, over the last sixty years, come to be seen as a controversial assumption behind the whole *SCC* project, stated by Needham in 1977 in the following words from an address given at the XVth International Congress of the History of Science in Edinburgh, which Métailié quotes:

I suppose we all generally agree that there is only one unitary science of nature, approached more or less closely and built up more or less successfully and continuously, even if very slowly, by the several groups of mankind from age to age. This means that we could expect to trace an absolute continuity between the first beginnings of astronomy and medicine in ancient Babylonia or ancient Egypt, through the advancing natural knowledge of mediaeval China, India, Islam and the classical Western world, to the break-through of late Renaissance Europe when, as has been said, the most effective method of discovery was itself discovered.

(Needham 1978, 110)

How far, nearly forty years later, can any historian of science still give wholehearted assent to these words? The nature of Métailié's sensitive and deeply informed answer to this question is set out in his book, and is to some extent indicated in his choice of title for this book: *Traditional Botany: An Ethnobotanical Approach*. I shall not anticipate it further here.

Instead, let me simply express my immense satisfaction that, as general editor, I have been able to see such a brilliant and rich contribution to our knowledge of Chinese understanding and appreciation of the natural world brought to press, and

to express my gratitude to the author for his decades of labour, and to all the others whose work has made it possible to reach this stage.

* * *

FAREWELL TO *SCC* . . .

This is the tenth and last volume of *SCC* to pass through the Press under my general editorship, which began in 1992. At this point it seems appropriate for me to say a few words of farewell, and to look back on the work I have done. I am not going to try to give an evaluation of the significance of the series in scholarly terms – that is a task that has been performed by many scholars over the last fifty years, with varying degrees of success and interest. Nor is this an attempt to write a full *Secret History* of the series as I have known it; whether that would ever be practical or appropriate is a question that may not be easy to answer.⁶ Instead I shall attempt to give the reader an informal sketch based on my recollections of what the experience of editing this series has been like, and of some of the decisions that have been made (or have made themselves) in relation to the coverage and publication of individual volumes.

The nine volumes that have previously appeared under my editorship are as follows:

Volume 5. *Chemistry and Chemical Technology*

Part vi. *Military Technology: Missiles and Sieges*. Joseph Needham and Robin D. S. Yates, with the collaboration of Krzysztof Gawlikowski, Edward McEwen and Wang Ling (1994)

Part xi. *Ferrous Metallurgy*. Donald B. Wagner (2008)

Part xii. *Ceramic Technology*. Rose Kerr and Nigel Wood, with additional contributions by Ts'ai Mei-fen and Zhang Fukang (2004)

Part xiii: *Mining*. Peter Golas (1999)

Volume 6. *Biology and Biological Technology*

Part iii. *Agroindustries and Forestry*. Christian A. Daniels and Nicholas K. Menzies (1996)

Part v. *Fermentations and Food Science*. H. T. Huang (2000)

Part vi. *Medicine*. Joseph Needham and Lu Gwei-djen, edited by Nathan Sivin (2000)

Volume 7. *The Social Background*

⁶ I hasten to reassure readers that such a history, were it to be made accessible, would be much less dramatic a work than (say) the *Secret History* of Procopius (written c. +550–60), even allowing for the difference of scale between the Needham Research Institute and the Byzantine Empire under Justinian. But it would have its moments of interest.

Part I. *Language and Logic*. Christoph Harbsmeier (1998)

Part II. *General Conclusions and Reflections*. Joseph Needham, edited by Kenneth Girdwood Robinson, with contributions by Ray Huang, and an introduction by Mark Elvin (2004)

Counting from my arrival on the SCC scene in 1992 to the likely date of appearance of the present volume, that makes a rate of publication of just under one volume every two years. May I say at once that it would have been impossible to make all this happen without the support of a small but dedicated staff at the institute. First there was Angela King, who performed a huge range of tasks part-time in my earlier years as editor. She was joined by John Moffett as librarian, and then came Susan Bennett, who became the institute's first full-time administrator, and hence the person with whom I have worked most closely over the years in corresponding with those involved in the project and pursuing all the practical tasks that publishing SCC demanded. Her work has been difficult and complex, and without her support and the ready backup of resources and help provided by John Moffett, my own task would have been impossible.

Each book has posed its own unique combination of challenges and demands. One thing all volumes had in common from soon after I took on my responsibilities was that they had passed through a newly instituted process of quality control, which I set in place with Needham's approval. This was designed to replace the system he had applied to his own writings, which had normally been reviewed in draft by a considerable number of specialist scholars before they were finalised. Under the new system, each complete draft manuscript for a volume was sent to at least two carefully chosen academic readers, who were invited to comment fully on the overall structure and detailed content of the book; the resultant reports were often fairly lengthy documents. These comments would then be reviewed, and agreement would be sought with the author on what changes were to be made in the manuscript. Once the manuscript had been revised (which might require a considerable amount of work on the author's part), it was sent again to the original readers, who were asked whether they felt it could now be recommended for publication. Given the searching nature of some readers' comments, it was a pleasant surprise to find that in nearly every case the process of agreeing and carrying out revisions passed without conflict of any kind. This is a tribute in part to the tact and thoroughness of the readers – who by the nature of their task must remain anonymous – but also to the dedication and openness of the authors who were prepared to take their advice.

But of course there were also problems to surmount in order to ensure that the series made progress. Some of the problems encountered were obvious ones, such as the need to raise funding to free some authors from their normal employment so they could work full-time on research and writing, and the sheer slog of seeing books through the mechanics of the copy-editing, printing and proof-reading process. The former was usually a pleasant and rewarding task, the latter perhaps

less so, although certainly indispensable. And we must not forget one essential element in the life of an *SCC* editor: finding ways to persuade authors with other responsibilities – often very heavy ones – that the time was at long last ripe for their manuscript to be completed. That was not always easy to do, since, as in many academic publishing ventures, the only reward an author could hope for after writing an *SCC* volume might be a few free copies, and the sheer glory of appearing as a contributor to Joseph Needham's great series.

In other cases, there has been the less pleasant duty of detaching the responsibility for writing a book from an author who was clearly never going to write it, and, if possible, transferring it to a more hopeful candidate. Needless to say, the books listed above represent the cases in which any such problems were solved. I hope I may be permitted to pass lightly over the very few instances where it became necessary to conclude that the case was hopeless; with luck, the reader will be unable to guess which topics and which scholars were involved: those are indeed possible ingredients for a *Secret History* that might be preserved in the institute's files for a later age.

My personal farewell to *SCC* does not mean there are no more books in the pipeline, for there are: a draft of a substantial portion of a book covering Section 37, 'The Salt Industry', is in existence, although its completion date is currently difficult to predict. Section 36, 'Mining and Metallurgy', has already had two books devoted to it – Peter Golas's Volume 5, Part XIII on *Mining*, and Donald Wagner's Volume 5, Part XI on *Ferrous Metallurgy* – and much work has already been done towards a volume on non-ferrous metallurgy, in which a major role is being played by my successor as director of the NRI, Professor Mei Jianjun.

But as I write these words in early 2014, there are certainly parts of the original plan where lacunae are likely to remain. Thus Sections 30 'Military Technology' and 31 'Textile Technology' have between them three substantial volumes covering much of their planned content, but two more would have been required to provide coverage as complete as that of Section 36. The topic of medicine, to which the original plan allocated Sections 43 ('Institutes of Medicine'), 44 ('Medicine') and 45 ('Pharmaceutics'), is represented only in the contents of the relatively short Volume 6, Part VI, as well as in the separately published *Celestial Lancets* mentioned above. While one cannot regret the time that Needham spent writing the volumes that occupied his time and energy during the seventh and eighth decades of the 20th century, and of his own life, it does seem a pity that his attention only turned to the preparation of the medicine volume when he was near the end of his life, so that all that could be done was to assemble, update and edit material he had written (and in some cases published) many years before.⁷

⁷ While regret would certainly be presumptuous, some readers of *SCC* may still perhaps wish that one at least of the four separate volumes on alchemy published between 1974 and 1983 could be exchanged for more writing by Needham on some of the subjects that he did not have time to cover at all during the unusually prolonged years of his full intellectual vigour.

A rather different case is presented by Section 39, 'Zoology', where the problem of the application of alien intellectual categories to pre-modern Chinese thought and practice is even more acute than Georges Métaillé has argued it was in the case of botany. For Needham, planning his work in the mid-20th century, the obvious way to structure a history of science was in accordance with the categories that contemporary scientists took for granted, and in this he was hardly alone. Over half a century later, such an approach was no longer acceptable. There is certainly a rich variety of information on animals to be found in Chinese texts through the centuries – including material in technical contexts such as agricultural treatises, books on veterinary medicine, and (in relation to medical use of substances of animal origin) the pharmacopoeia. But the general study of animals in their own right was simply not a recognised category of intellectual and literary activity in pre-modern China. It proved impossible to produce material for this section that could fulfil the requirements for publication in the *SCC* series.

Volume 7, *The Social Background*, is certainly the one in which Needham's original ambitions remained furthest from fulfilment. In the pamphlet plan of 1979, this was to contain the following parts:

- 46 Retrospective survey of the characteristics of Chinese science,
- 47 Geographical factors,
- 48 Fiscal and economic circumstances,
- 49 Intellectual and social factors,
- 50 General conclusions.

The story of the evolution of Volume 7 and its parts is highly complex, and I can only summarise the lucid account given by Kenneth Robinson in his editorial preface to Volume 7, Part II, pages xix–xxiii. As Robinson recounts, for much of his eighties Needham still hoped to achieve his goals for this volume through the efforts of a large team of collaborators. To help him carry out that plan, in 1980 he summoned Robinson (who, as mentioned above, had worked with him on Volume 4, Part I, but was then in Hamburg) to join his team in Cambridge with special responsibility for Volume 7. At their most ambitious, plans for the volume envisaged that it would appear in as many as four parts, one of which was planned to contain six contributions by different authors. But, as Robinson sums up the situation,

One by one items in this ambitious scheme of things had to be abandoned, either because Needham found the work that was submitted unacceptable, or because the author was unable to complete it, or decided to withdraw it. In some cases work that had been completed and accepted had to be abandoned when the failure of other contributions withdrew vital elements from the structure.

(Volume 7, Part II, xxi)

To give just two examples of the kind of problem that arose – a complete manuscript for Section 47, 'Geographical Factors', was in fact drafted by an expert geographer. But despite being an excellent treatment of the historical geography of

China, it was not felt that this contribution addressed what Needham had in mind – which was the extent to which the geography of China might have influenced the way scientific and technical thought and practice had developed there. In the case of Section 49, a quite different problem arose, when a distinguished American scholar, the late Derk Bodde, offered Needham what was in effect a complete draft of Section 49. Unfortunately, Needham found himself quite unable to agree with the views Bodde expressed. Vain efforts were made to arrange a compromise, including a somewhat idiosyncratic proposal by Needham to accept Bodde's contribution on condition that it was published with his own criticisms in parallel. The responsibility for efforts to reconcile two irreconcilable viewpoints fell to Robinson, who summed up his experience in the words of a Burmese proverb: 'Where elephants fight, the grass is trampled'. Eventually, in 1985 Bodde simply withdrew from the project, and made other arrangements to publish his work.⁸ So another section designed for Volume 7 was, in effect, largely abandoned.

One collaborator's work did survive these processes of unravelling and conflict, to appear as a single 'earthly volume', and that was the contribution of Christoph Harbsmeier. This provided something of what had been intended for Section 49, covering what the 1979 plan placed under the heading 'Chinese language and logic', which amounted to one-sixth of the topics that the entire Section 49 had been planned to include. Harbsmeier's contribution appeared as Volume 7, Part 1, with the title *Language and Logic in Traditional China*. But while an excellent piece of scholarship in its own terms, Harbsmeier's book largely abstained from asking or answering the question that Needham certainly had in mind while drafting his plan – that of how far the Chinese language had any influence on the development of science in China.

Needham died in March 1995 without completing what was to be his own contribution to Volume 7, containing Section 50, 'General Conclusions'. He had, however, made provision for such an event in the form of a document first drafted in 1981 and updated in 1987, indicating what he wanted to be done if he was unable to finish Section 50 in person. It was on that basis that Kenneth Robinson did his work to prepare Volume 7, Part 11 for the press – a demanding task to be begun by any man (apart perhaps from Needham himself) who, like Robinson, was already in his late seventies. In essence, Needham's wish was that certain materials he had already prepared for Section 50, and in some cases published in draft form as articles or lecture texts, should be edited for publication.⁹ As Needham's health began to fail, Robinson worked closely and tactfully with him to discuss how this was to be done. But, as Robinson notes, when Needham died 'none of the material that he had intended for Volume 7 was in a condition ready

⁸ It eventually appeared in expanded and modified form as Derk Bodde (1991).

⁹ Some signs of the original multi-collaborator plan for Volume 7 remained in these plans. Thus Section 50, part (c), 'The nature of Chinese society: a technical interpretation', was co-authored with Ray Huang, and (e), 'Literary Chinese as a language for science' – originally intended as part of Needham's response to Derk Bodde – was written with Kenneth Robinson.

for the Press'.¹⁰ The task of getting it ready fell mainly on Robinson, and I do not think that anybody without his long and close acquaintance with Needham could have succeeded in the task he faced, and succeeded in a way that faithfully reflected Needham's intentions. It was my privilege to share his confidence as he worked on this demanding task.

Readers familiar with Needham's earlier writings on Chinese science and society will not find any great surprises in part (f), 'Conclusions', of Section 50. The ninety-year-old Needham had not radically changed the position that he had articulated from the 1950s onwards, which saw what he thought of as the distinctively 'feudal-bureaucratic' form of pre-modern Chinese society as the major determinative factor in the way science and technology had developed in China, and – in so far as he was interested in the issue – the answer to what others called the 'Needham Question'.¹¹ So, for Needham, was all the research and writing that went into the *SCC* series for over fifty years simply a long journey to get back to where he had started? If so, what was the point of it, especially given the extent to which the original plan remained unfulfilled in significant respects? Would it not have been better if Needham, resisting all temptation to expand, had stuck rigidly to his plan for a survey of the field in seven books, which might perhaps have been finished sometime in the 1970s? That way we would have had a survey of the field as it stood after mid-century, with its author's final views informed by the full and consistent conspectus he could have offered his readers.

I shall attempt no more than a personal response to that question. First, let me say that when I first stumbled across *Science and Civilisation in China* about forty years ago, I would have been delighted to have been able to read such a compact but compendious work as Needham might have produced under different circumstances. But I am quite convinced that my temporary gain would have been a great loss to scholarship in the longer term. The fact is that the reception of the first few volumes of the series convinced Cambridge University Press that they had a unique publishing phenomenon on their hands, and as Needham's fame grew they became willing to publish books that would never have stood a chance of publication if they had been proposed to them as free-standing monographs. I cannot imagine, for instance, that any publisher approached by a scholar in the late 1960s would have accepted for independent publication a book such as Volume 4, Part III, *Civil Engineering and Nautics*, comprising 699 pages of main text, with copious illustrations and a complex typography with two separate series of footnotes on each page, one of the normal kind, and the other with Chinese characters.¹² The same consideration applies to many of the subsequent volumes of the series, including those written by collaborators. However excellent these books might be in themselves,

¹⁰ *SCC* Volume 7, p. xxii.

¹¹ The best survey of the history – and prehistory – of this issue is undoubtedly Liu Dun (2000).

¹² It was not until 1999, with the publication of Peter Golas's volume on mining, that the Press was persuaded that technical advances in typesetting had made it possible for Chinese characters to appear in the main text.

few of them would have made their way onto so many library shelves worldwide in such substantial, lengthy and well-produced form if they had not had the benefit of following in the deep and wide channel of publication carved by the preceding volumes, and kept open by Needham's increasing personal eminence as a figure known well beyond the world of scholarship.¹³ Nor can we discount the effect of the continued presence of Needham and his project in promoting the growth of the field in terms of individual careers, and the institutionalisation of the field through the creation of permanent posts concerned with the research areas he pioneered.

Finally, let us consider the Needham Research Institute itself. In the first half of the 1970s, the work of the project was based in two rooms in Caius College Cambridge, of which Needham was then Master. Had the project ended in that decade, it is unlikely that much more would have come of it in institutional terms. However, given the long continuation of the project, there gradually grew up the idea of creating an independent institute, one that would house Needham's unique library on a permanent basis, and give a home to those who worked on the project and on other related research. For a while the institute was housed in temporary buildings made available by Cambridge University Press in Shaftesbury Road, Cambridge, before transferring to a house owned by the Press in Brooklands Avenue. By the 1990s, it had moved to an elegant and spacious purpose-built home erected on land to which Robinson College granted a ninety-nine-year lease, at the corner of Herschel and Sylvester Roads, where it still is today. There is today no better environment for research into the history of East Asian science, technology and medicine anywhere else in the world than the Needham Research Institute. What is more, during my tenure as director (2002–13) I have had the satisfaction of seeing the institute set on a secure basis of independent funding that will guarantee its existence into the indefinite future.

The Needham Research Institute has its own corporate badge or logo in the form of the well-known red seal that Needham had cut for use on the books he gathered for his library. But the series itself has never had a logo. What kind of badge might be suitable, one wonders? Presciently, the ancient diviners who compiled the *Yi jing* 易經 'Book of change' chose for the sixty-fourth and last hexagram in the conventional order the name *Wei ji* 未濟, usually translated as 'Not yet completed'. That certainly applies to *Science and Civilisation in China*. But I hope that the reader may agree with me that, like the hexagram and the prognostications associated with it, this situation leaves us not so much with a sense of dissatisfaction as with a consciousness of infinite creative possibilities to come in all aspects of the legacy that Joseph Needham has left us.

¹³ In evidence for this assertion, I need only point to the eagerness of even university presses nowadays to banish notes from the page and gather them into 'endnotes', and to the (to me at least) astonishing willingness of some publishers, particularly in the United States, to bring out substantial works of scholarship on China without a single Chinese character anywhere inside their covers.

The hexagram *Wei ji* shows an activating tension and antisymmetry through the switching of *yin* and *yang* lines between the fire trigram *li* 離 above (creative, active and illuminating), and the water trigram *kan* 坎 below (sustaining, receptive and inexhaustible): ☲. And in the traditional interpretation, after the 64th hexagram one reverts to the first of the sequence, ☰ *Qian* 乾, the ultimate symbol of creativity and power. Given the characteristics of the unique personality and the wider project that have together given rise to *Science and Civilisation in China*, if a symbol for the series had been needed, it might perhaps have been found here.

Christopher Cullen

AUTHOR'S NOTE

I should like to thank all those who, in the course of my long, slow progress, have offered me their help: in the first place the librarians Philippa Hawking, Carmen Lee and John Moffett, and the successive managers of the funds that Joseph Needham set up and that they have helped to sustain and increase. I also thank, in Paris, Nicole Resche, followed by Delphine Spicq, the librarians of the Institut des hautes études chinoises, the librarians of the Central Library and of the Library of Phanerogamy of the Muséum national d'histoire naturelle; in Kyoto, the staff of the Department of Humanities and the Pharmacy Faculty of the library of the University of Kyoto, and that of the Kyu-O library of the Takeda Foundation in Osaka; Mme Komatsu Michi of the Makino Library in Kochi; the staff of the Asian Department of the Library of Congress; and also that of the Dumbarton Oaks Library in Washington, DC. My thanks also go to the colleagues and friends who, at particular moments, took the trouble to proffer advice on some passages in my text, discuss certain points and make suggestions, and also to draw little-known documents to my attention, in particular Bénédicte Bilodeau, Francesca Bray, Karine Chemla, Piotr Daszkiewitz, Marie-Pierre Dumoulin-Genest, Benjamin Elman, Mark Elvin, Bernard Gagey for his help in checking the iconography, Jacques Gernet, Annick Horiuchi, Minghui Hu, Antoine Jacobsohn, Yojiro Kimura, Jacques Legrand, Tiziana Lippiello, Lü Ping, Kiyoshi Matsuda, Clare Perkins, Jacqueline Pigeot, Claude Rives (who furthermore taught me how to graft fruit trees), André Vialard-Goudou, Zheng Jinsheng and Marie-Hélène Tritsch for her unfailing support. Of those who are no longer with us and to whom I owe a great deal, I should like to mention André Georges Haudricourt and Lucien Bernot, whose teaching greatly contributed to my scientific progress; Hu Daojing and Liang Jiamian, scholars with vast and generous knowledge; and, of course, Joseph Needham, who, along with Lu Gwei-djen, entrusted me, without restrictions, to write this book. This started me on a long intellectual journey that fuelled my thinking for many years. I must also thank the General Editor of the SCC series, Christopher Cullen, and the Needham Research Institute Administrator Susan Bennett for continuing to encourage my work and for their great patience. I am most grateful to the copy-editor for this volume, John Gaunt, and his editorial colleagues at Cambridge University Press for all they have done to bring this very complex book to birth. Finally I would like to thank the first two anonymous readers of my manuscript for their pertinent remarks and suggestions, and, last but not least, my warmest thanks to my translator, Ji Lloyd, who, by rendering my French into English, has made this publication possible.

38 (2) TRADITIONAL BOTANY: AN ETHNOBOTANICAL APPROACH

INTRODUCTION

This volume, which Joseph Needham and Lu Gwei-djen entrusted me to produce, is the sequel to Volume 6, Part I, *Botany* (1986). It consists of three parts. The first addresses various aspects of traditional Chinese botany, as I have managed to reconstruct them by analysing various documents devoted to the subject of plants. This is therefore reconstituted knowledge that I have deduced from the original texts. This part of the work thus follows on directly from Volume 6, Part I, and belongs together with that previous volume. Part II and Part III could have formed the subjects of separate volumes. The former tackles the domain of the history of techniques by presenting a study of various aspects of horticultural practice in ancient China. The latter studies exchanges of plants, foreigners' discovery of Chinese flora and the influence that Chinese gardens exerted upon European ones. Part I ends *grosso modo* before the end of the Qing dynasty, as does Part II, whereas most of the works and facts mentioned in Part III date from the 17th century.

Although conscious of the problems that this apparent incoherence might present, I decided to stick as closely as possible to Joseph Needham's plan for this volume. Actually, reading the text, it becomes clear that the incoherence is actually no more than apparent, for many of the texts cited in the various parts 'correspond' at the level of the logic of their contents (see, for example, the concept of plant life and grafting practices).

When Joseph Needham entrusted this task to me, he also gave me a copy of all the notes that he had made with Lu Gwei-djen. He advised me to use them as I wished, to add whatever I thought useful and perhaps to reject some of them. My text rests upon that whole collection of documents, to which a comparable number of further notes, resulting from my own reading, have been added.

Readers of the preceding volume devoted to botany will have recognised the importance attributed to plants in specialised medical and horticultural literature. They will be familiar with the often laudatory descriptions of the techniques and knowledge of Chinese gardeners such as those produced by Father Cibot in particular.¹ However, it is remarkable that no mention of botany as an autonomous science was made by the earliest missionaries who lived in China. Perhaps that is because, in 17th-century Europe likewise, botany was still hardly a science. However, in the 19th century, De Candolle wrote,

¹ See Cibot (1777, p. 623; 1778a; 1778b).

In the course of my researches, I have on many occasions felt how very helpful a study of Chinese and Japanese encyclopaedias would be to the history of cultivated species, which, in its turn, is important for the history of nations.²

It was a remark that, in roughly the same period, in 1852, the observations of Hoffmann and Schultes confirmed:

If these countries were occupied by barbarians, we would content ourselves with what travellers discovered there and told us about, but the natives of China and Japan, who are fortunate to belong to a very ancient civilisation, and who have examined and determined what plants grow on their land, have produced a native literature on the plant kingdom. That literature provides us with an ample harvest of interesting notes on the country, the migration, and the geographical distribution and use of cultivated plants, and promises to provide us with not only knowledge of this Flora, but also extremely interesting notions about the industry and arts of this country.³

Yet two decades later, in 1878, a Dutch scholar, A. J. C. Geerts, who pioneered the teaching of chemistry in Japan, would declare, when introducing a study on *The Products of Japanese and Chinese Nature*:

In China, one cannot yet speak of the development of a free and pure science of nature, because this is only cultivated for essentially practical purposes. The progress made by the natural sciences in Europe since the last century has had very little influence on the state of knowledge of that nation, so that its scientific knowledge is hardly different from the picture that Von Siebold produced of natural history among the Japanese fifty years ago.⁴

Nevertheless, not much later, in the Preliminary Notices to the first volume of the *Botanicon Sinicum*, Emil Bretschneider, doctor to the Russian Legation in Beijing, declared: 'There are numerous Chinese works dealing especially with Botany, Agriculture and other kindred sciences relating to Practical Botany. They are replete with information regarding the uses of plants for food, clothing, manufacturing purposes, etc.'⁵ It is important, at this point, to note one crucial aspect of my work. In accepting the proposal made by Joseph Needham and Lu Gwei-djen, I had in effect accepted the idea that a form of clearly defined botany did exist in ancient China, given the voluminous corpus of texts to be analysed. However, as my reading proceeded, I was forced to admit, in the first place, that I had come across no Chinese term that might have even one of the modern meanings of 'botany'.⁶

² De Candolle (1855), cited by Bretschneider (1881, pp. 20–1).

³ Hoffmann and Schultes (1852, p. 6). This very precious article provides Japanese names in Latin transcriptions as well as 'Chinese names used by the Japanese' in characters and accompanied by their Chinese and Sino-Japanese transcriptions. To set up this list, the authors had access to documentation brought back by Siebold and, in particular, to 'a complete list in Japanese and in Chinese of the plants collected by him, which he had had made in Japan by a Japanese scholar'.

⁴ Geerts (1878, p. 6). This volume is devoted to 'the inorganic and mineralogical part'. See Siebold (1826).

⁵ Bretschneider (1881, p. 21).

⁶ For example, the *Longman Dictionary of the English Language* (anon. 1984, p. 166) gives the three following definitions. 1. (A branch of biology that deals with) plants and plant life in the world; 2a. the plant life of a particular region; 2b. the properties and vital phenomena exhibited by a plant, plant type or plant group'. If we

Furthermore, nor had I found any term that referred to any traditional knowledge specifically about plants before the creation, in 1858, of the term *zhìwúxué* 植物學, meaning botany in the modern sense of the term. Finally, among the abundant literature that I was working through, there was no text that could be regarded as a kind of botanical manual, nor was there any reference to what we call a flora.⁷ So was there no botany in China at that time? One is bound to recognise its absence if we consider, in comparison, the thought on plants that developed in Europe from the 13th century onward with the first works of Albertus Magnus (c.1193–1280)⁸ and the innovatory contribution of Valerius Cordus (1515–44),⁹ which, from the 17th century onward and above all in the 18th century, gave birth to a whole body of structured knowledge that was founded on observation and experimentation and that continues to evolve, namely modern botany. However, if the term ‘botany’ was taken to mean a whole body of types of knowledge – not always formalised and by no means exclusive – that relates to the plant world, then a vast and rich field of study opened up before me. That is why, in order to avoid all ambiguity and anachronism, I decided to refer, in the title to this volume, to ethnobotany, a discipline that studies relations that human societies and groups maintain with the plant world, essentially by drawing on the way in which their members describe, name, classify and interpret plants. A citation from an author whom Joseph Needham greatly appreciated and whom he advised me to read, Edward Lee Greene, will explain my approach and the method that I have adopted. In an early work published in 1909, Edward Lee Greene, the author of *Landmarks of Botanical History*, wrote the following very stimulating lines that define my own approach and the method that I have adopted and which shed new light upon the history of botany:

Botany did not begin with the first books on botany, nor with the men who indited them, though every historian of the science whom I have read has assumed that it did. The most remote and primitive of botanical writers, of whatever country or language, found a more or less extensive vocabulary of elementary botany in the colloquial speech of all. The chief organs of plants – stem, trunk, branch, leaf, flower, fruit, pod, seed, root, tendril, thorn, and a multitude of others – had been discriminated and named; the organs even known by all who had acquaintance with plants and trees, and the names were everywhere in use. Even the functions of several of the organs had been correctly ascertained before ever a line of botany had been written, most probably even before letters had been invented. The improvement of wild things by cultivation, the propagating of the newly acquired sorts of cuttings, by division of perennial roots and, in the case of trees, by grafting, are likewise arts that seem to antedate history; as do also the designating of different varieties

turn to the *Webster's Third New International Dictionary* (Babcock 1986, p. 258) we read the same three definitions, plus a fourth one, which is ‘a botanical treatise or study: esp. a particular system of botany’.

⁷ The meaning of this term is: ‘A work that describes and classifies the plant species of a region’, in Germain de Saint-Pierre (1870, p. 556).

⁸ On the work of Albertus Magnus, see Pouchet (1853, pp. 297–308); Sprague (1933a; 1933b); Arber (1950, pp. 24–32).

⁹ See Greene (1983, pp. 368–415); Morton (1981, p. 126); Sprague & Sprague (1939).

or species that are evidently nearly akin, by two-fold names, one generic, the other specific or varietal.¹⁰

I thus set out in quest of the knowledge – or different types of knowledge – about plants that had been written down in the course of Chinese history. These bodies of knowledge are scattered throughout the literary genres written by Chinese literati. Fortunately for this research, much of the activity of literati was devoted to organising the scattered notes of predecessors into a thematic form in encyclopaedic works. As a result, there exist sections of great general encyclopaedias that are specifically devoted to plants; and there are likewise anthologies of texts that are devoted solely to plants.¹¹ I also made use of treatises on painting, texts commenting on the ancient Classics and notes written down as ‘brush-stroke jottings’, *bi ji* 筆記 or *suibi* 隨筆. My investigation into the nature of this botany will not be limited to the literary genres cited above. The texts of works on *materia medica*, *ben cao* 本草, horticultural monographs, descriptions of exotic plants¹² and likewise agricultural treatises¹³ already mentioned in previous volumes and general treatises on horticulture, which I shall shortly be describing: all these too have formed the basic material that I have used in an attempt to present a body of knowledge whose possessors seem not to have felt the need for systematic formalisation.¹⁴ Essentially, my study thus concerns types of knowledge as they are reported by literati. De facto, even if some do reflect popular practices (horticultural treatises, for example), they have undergone a process of organisation that turns them into works that reflect not only the point of view of their authors but also a certain orthodoxy in their style and form. It would certainly have been interesting to take account equally systematically of popular works and genres that are not directly related to plants, such as accounts of travels, monographs, local gazetteers and so on. Such texts do get a mention, but only when they are cited, as they often are. But it seemed to me that research of that kind in itself constituted a different subject; and I have preferred to concentrate on scholarly specialised literature, particularly given that Joseph Needham’s notes concerned only texts belonging to this category. So, faced with the spectacle of the plant world, what was the attitude of these men who have left us their impressions?¹⁵ The introductory remarks to their treatises are illuminating on this point: they are moved by practical concerns but also by philosophical

¹⁰ ‘The Philosophy of Botanical History’, in Greene (1983, p. 118). Since I first read it, this first volume has appeared in a remarkable second edition, accompanied by the publication of a second posthumous volume. Both are expanded by numerous very valuable notes and an abundant, equally valuable bibliography produced by Frank N. Egerton.

¹¹ The titles of these works generally contain *caomu* 草木, ‘grasses-trees’, and also *fang* 芳, ‘fragrances’.

¹² See *SCC* Volume 6, Part 1, pp. 440 ff. ¹³ See *SCC* Volume 6, Part II, by Francesca Bray.

¹⁴ In a letter dated 21 October 1773 that Pierre Cibot sent from Peking to Stehlin, a member of the Académie des sciences in Paris, Cibot commented on this subject as follows: ‘It would have been easy for me to reach further and show to what extent the Chinese have deigned to pay attention to the facts in their study of Nature but without paying attention to its Laws or connecting them by systems’. I must thank Marie-Pierre Dumoulin-Genest for bringing this document to my attention (Fonds JBM 65, Archives des Jésuites, Vanves).

¹⁵ I have come across only texts by male literati but a few rare women have left pictures of plants.

preoccupations. Sometimes it is a matter of helping doctors to acquire a better understanding of *materia medica* so as to provide better care; sometimes of teaching how to cultivate the soil in order to produce edible or ornamental plants; or how, using ink and a brush, to bring to life the plants that are provided by nature or the arts of a gardener. But almost always there is a mention of a quest for an ultimate knowledge, which refers to a famous passage at the beginning of the *Great Study*, *Da xue* 大學, one of the Confucian Classics relating to ‘the investigation of things’, *gewu* 格物, which is the means of ‘reaching an extension of knowledge’, *gezhi* 格致:

The ancients who wished to illustrate illustrious virtue throughout the kingdom, first ordered well their own states. Wishing to order well their own states, they first regulated their families. Wishing to regulate their families, they first cultivated their persons. Wishing to cultivate their persons, they first rectified their hearts. Wishing to rectify their hearts, they first sought to be sincere in their thoughts. Wishing to be sincere in their thoughts, they first extended to the utmost their knowledge. Such extension of knowledge lay in the investigation of things.¹⁶

The thoughts that Chen Jingyi 陳景沂, the author of the *Quan fang bei zu* 全芳備祖, records in his preface, dated 1256, are particularly revealing regarding the practical applications of those thoughts:

It is said that the Heaven and the Earth produce things (*wu* 物). But is there not also that which controls itself? The eye blinks and does not seek for the basis and origin of this, so how does this case differ from that of the morning mushroom [which makes no distinction between the morning and the evening]? Why are bamboos hollow and trees solid? [There are some plants that] grow in the spring and wither in the autumn while others remain unchanged throughout the four seasons. Branches become leafy. What it is difficult to know is the principle (*li* 理) behind these changes . . . Some people reproach me for indulging in trifles and producing pleasant amusements. I shall reply to them with an adage of the Ancients: ‘absorb yourself in the meaning of things and do not be misled simply by their appearance’. Anyone who indulges in mere distraction is indeed ridiculous, but the *Great Study* (*Da xue*) bases its teaching above all on the observation of things (*ge wu* 格物) and the task of whoever studies (*xue zhe* 學者) is to acquire a good knowledge of the names of birds, beasts, grasses and trees.¹⁷

That last sentence alludes to remarks of Confucius, recorded in the *Lun yu* (Analects) in Book 9, Chapter 17, 9:18 ‘My children, why do none of you study the *Poems*? . . . They tell us much about the names of animals and plants’.¹⁹ This passage, the meaning of which may seem insignificant, in fact reveals a fundamental aspect of ancient Chinese thought, namely the theory of *zheng ming* 正名, ‘the rectification of names’.²⁰ This short

¹⁶ See Legge (1969, pp. 4–6). On the subject of this idea, see *SCC* Volume 6, Part 1, pp. 440–3; Fung Yu-lan (1952–3, Volume 1, pp. 362 ff., Volume 2, pp. 629 ff.); Lau (1967); Peterson (1975); Cheng (1997, pp. 503–4, 508–9 and 452–4, 490–1).

¹⁷ English version of author’s French translation, Chen Jingyi (1982), pp. 9–10.

¹⁸ See Couvreur (1949, p. 266); Legge (1969, p. 383).

¹⁹ English version of author’s translation.

²⁰ *Xun zi* 22, cf. Zhang Shitong (1974, pp. 275–6), runs as follows: ‘Men of discernment established principles of partition and distinction and introduced names to designate realities, their primary aim being to distinguish the

text, along with that of the *Da xue*, cited above, and a firm belief in the importance of correct names,²¹ really do constitute the basis upon which, in ancient China, all thought on natural living objects was founded. Echoes of it are to be found in virtually all later texts; and in the course of the present work, we shall repeatedly see the extent to which, especially from the Song dynasty onward, those few words fundamentally affected the way in which Chinese literati apprehended anything to do with nature and how they wrote about it. To cite but one example, even though Li Shizhen (1518–93) writes that he composed his *Ben cao gang mu* (+1596) specifically for doctors, he nevertheless states that his work also belongs to the study involving ‘the investigation into things’, *ge wu zhi xue* 格物之學,²² and all the entries in his book are defined by a *zheng ming*, a correct name. And so it is with all other authors. The way in which this investigation should be conducted is not always explained and, on this account, the task undertaken by those authors may seem similar to that of modern botanists, namely to apprehend the plant world and explain it. However, on one point it differs radically, namely the moral purpose of this enterprise, which is expressed clearly by the context of the passage from the *Da xue*, the *Great Study*, mentioned above. Another scholar who wrote a *Ge zhi jing yuan* 格致鏡元 (Mirror of the Origin of the Investigation of Things), dated 1735, Chen Yuanlong 陳元龍, provides precious information regarding the way to tackle this study of living things. Right at the beginning of his Introduction, he writes as follows:

There is an infinity of things that fill Heaven and Earth. We must know them all without exception. This knowledge is what fulfils my mind. If he omits a single thing, a decent man is ashamed. That is why he scrutinises [the nature of things] in depth (*ge zhi* 格致).²³

He goes on to say that the three domains in which this quest should be pursued are the reality of things, *shi* 實; names, *ming* 名; and categorisations, *lei* 類. This is simply his way of making more explicit the method recommended by the theory of the rectification of names, which consists in matching names to reality, for to know is ‘in fact to recognise the pre-existing distinctions between qualitative categories’.²⁴

It was thus that, bearing in mind on the one hand Greene’s remarks and, on the other, the importance that should be ascribed to real objects, their names and their classifications, I decided, through an analysis of texts of widely varying content, to give an account of Chinese knowledge about plants and to analyse the naturalist aspect of the efforts of the authors and compilers involved. As my work proceeded, I became increasingly aware that Greene’s ethnobotanic approach was perfectly suited to what I discovered in the texts. This confirmed my conviction that ‘traditional’ or ‘indigenous’ ‘Chinese botany’ should be studied from an anthropological

noble from the vile, but also between what was similar and what was different’. From the French translation and citation in Cheng (1997, p. 216).

²¹ On this subject, see the articles collected by Karine Chemla and François Martin (1993).

²² In his introduction *fan li* (Li Shizhen 1975–81, Volume 1, p. 34). ²³ *Ge zhi jing yuan*, 1a.

²⁴ Cheng (1997, p. 216).

point of view rather than, *a priori*, as a stage in a process that led to modern botany. My rejection of a teleological approach was to make it possible for me to consider the content of all the Chinese sources, not in comparison to post-Linnaean texts but within their own context. If a comparison with modern science turned out to be necessary, it would come only after this prior independent investigation. By so doing, I realised that I was bringing into question one of the axioms of Joseph Needham's historiographical approach that he had expressed, for example, in his 'Address to the Opening Session of the XV International Congress of the History of Science, Edinburgh, 11 August 1977':

I suppose we all generally agree that there is only one unitary science of nature, approached more or less closely and built up more or less successfully and continuously, even if very slowly, by the several groups of mankind from age to age. This means that we could expect to trace an absolute continuity between the first beginnings of astronomy and medicine in ancient Babylonia or ancient Egypt, through the advancing natural knowledge of mediaeval China, India, Islam and the classical Western world, to the break-through of late Renaissance Europe when, as has been said, the most effective method of discovery was itself discovered . . .

Of course we must not see in the traditional sciences of China or India simply 'failed prototypes' of modern science; we must get inside the minds of those who cultivated them and understand how it was that they came to their conclusions. But we must never deny the fundamental continuity and universality of all science.

All the ancient and mediaeval systems before the coming of modern science need to be studied and defined in contrast with our present-day pattern of ideas, which is itself of course not final . . . Modern ecumenical science was indeed their common end, but their appearance can only be explained in the context of the various possibilities open or closed within the totality of ideas, values and social attitudes of their times and places.²⁵

In accordance with this line of reasoning, Joseph Needham presented ancient Chinese botanical knowledge by comparing it systematically with modern botany. In his concluding remarks on the subject of Chinese botany, he writes that 'Li Shih-Chen (1518–1593), building on the Liu Wen-Thai's foundation,²⁶ brought classification in botany to a Magnolian or Tournefortian level'. In Volume 6, Part 1, he had already written, 'We find that indigenous Chinese botany reached a Magnolian or Tournefortian level rather than a Linnaean one', and in the same volume (p. 177), we find,

So one again acquires the impression that traditional Chinese botany attained a Magnolian or Tournefortian level, not an Adansonian one. To speak in this way is not to imply that the Chinese felt the need for a formalised system in the manner of Tournefort, but they perceived very clearly the relationship between plant genera, even though these were often 'submerged' within their oecological and physiological classification.

²⁵ Needham (1978, pp. 110, 111).

²⁶ The main editor of the *Bencao pin hui jing yao*, a great work on *materia medica* achieved in 1505 that remained as a manuscript in the imperial library. This text will be discussed along with works of *materia medica*, see section (f)(2)ii in this volume.

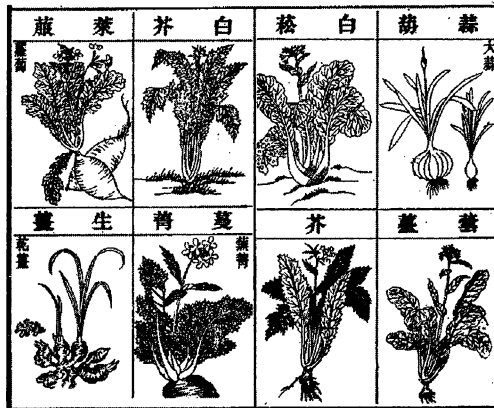


Fig. 1. Six plants all belonging to the Brassicaceae family, bordered by drawings of *hu suan* 葫蒜 or *tian suan* 天蒜 (*Allium sp.*) (top right), and ginger (bottom left). This is an example of what Joseph Needham refers to as a 'submerged family'. From *Ben cao gang mu*, reproduction of the 1885 edition (Li Shizhen, 1965, Volume 1, p. 68).

To appreciate this declaration, we must bear in mind the classification of plants proposed by Li Shizhen, which is the most sophisticated of all those to be found in Chinese texts.²⁷ But it is important to remember that it concerns only about 1,095 medicinal plants. Li Shizhen indicates, in an introductory chapter, *Fan li* 範例, that he is arranging them, from the smallest to the largest, in five principal sections called *bu* 部, subdivided into thirty categories, *lei* 類. The five sections, in order, are: *cao* 草 grasses, *gu* 穀 grains, *cai* 菜 vegetables, *guo* 果 fruits and *mu* 木 trees. These categories are defined by a variety of criteria. For the grasses these are ecology, morphology, taste, toxicity; for the grains, the different kinds that are cultivated; for the vegetables, taste, texture, form and ecology. Ecology, taste and form are also the criteria for fruits, while trees are distinguished by their perfume, their bearing and their nature. Alongside this apparent distribution clearly explained by Li Shizhen, in several cases we notice, within the same category, that whole lists of the names of plants belonging to the same botanical family are enumerated. For example, seven plants belonging to the Brassicaceae family are cited successively in the category of 'sweet and slippery' plants (*rou hua lei* 柔滑類, *juan* 27) (Fig. 1). This is an example of what Joseph Needham calls 'submerged families' that correspond to the 'covert categories' of anthropological literature. In truth, categories of this type are to be found in nearly all folk taxonomies. Their convergence with the taxa of scientific taxonomies generally seems to be quite limited. Furthermore, this same book also contains taxa grouped in a way that seems altogether strange to a modern taxonomist. In Volume 6, Part 1, pp. 170–6, Joseph Needham and Lu Gwei-djen mention the example of plants that belong to what they call 'the *ma* 麻 group', i.e. plants that have a plurisyllabic name ending in *ma*, a term that may be translated minimally as 'hemp'.

²⁷ This will be developed in detail at pp. 77–99.

More than twenty plants and trees have this character in their names, though belonging in terms of modern botany to more than a dozen families . . . The resemblances were perfectly real, whether in fibres fit for textiles, in oil extractable from the seeds, or in the shapes of leaves, the polygonal character of the stem cross-section, the position of the seeds in the capsules, etc.

(Volume 6, Part 1, p. 170)

Given the criteria listed above, one can understand how it was that these plants were all considered kinds of *ma*, in that this refers to hemp, *Cannabis sativa* L. Also understandable is why they do not belong to the same genus or the same botanical family. Indeed, the principal criteria for associating textile fibres and oleaginous seeds are not recognised in botanical systematisation, and the shapes of leaves and stems and the manner in which seeds are arranged in their capsules are considered by botanists to be distinctive criteria of secondary importance.

Now let us turn to Pierre Magnol (1638–1715) and Joseph Pitton de Tournefort (1656–1708). Magnol was the first French botanist to take an interest in natural classification, ‘who, inspired by Ray’s [‘most natural and philosophical’] method, had proposed the family as natural taxonomic grouping and had discussed the criteria for defining them with extreme acumen’ in his *Prodromus Historiae Plantarum in quo Familiae Plantarum per Tabulas Disponuntur* (1689).²⁸ Tournefort, for his part, proposed an artificial system of ‘attractive simplicity’,²⁹ ‘principally on the basis of the characters of the corolla and the fructification’,³⁰ in his *Institutiones Res Herbariae* (1700), in which 698 genera are defined and illustrated. When we turn to consider the work of Li Shizhen, it seems that his classification has nothing in common with the methods proposed by Magnol and Tournefort. For his principal categories, *bu*, he follows the model presented by Tao Hongqing (456–536) in his *Shen nong bencao jizhu* 神農本草集注 (Collected Commentaries to the *Shen nong bencao jing* 神農本草經 (late 6th century). As for his categories, *lei*, far from being deductive, they are fundamentally subjective, taking account of a variety of factors such as ecology, taste and toxicity, and even including artefacts such as products derived from soya seeds and old pieces of wood that have served for a variety of uses. The teleological approach leads to another comparison between Li Shizhen and Tournefort in order to justify the level attained by traditional Chinese botany. Volume 6, Part 1, pp. 176–7, runs as follows:

Perhaps the most striking comment that can be made concerning the Chinese knowledge of the hemp plant is that while they preceded everyone else in the appreciation of its dioecious character, Chinese botany did not, down to the end of its time of independence, range hemp in the same family as the mulberry (Moraceae). But how many of us realise the lateness of this appreciation in Europe? De Tournefort (+1700, +1719) had them as far apart as Li Shizhen, the former (*Cannabis*) a genus 5 of section 6 of class 15 (herbs and suffruticose plants with apetalous or staminate flowers), the latter (*Morus*) as genus 4 of section 4 of class 19 (trees and fruit-trees with amentaceous flowers). By +1763, however, Adanson is placing them together in his chestnut family, Castaneae (no. 47). So one again acquires the

²⁸ Morton (1981, p. 294).

²⁹ Morton (1981, p. 295).

³⁰ Morton (1981, p. 228, n. 42).

impression that traditional Chinese botany attained a Magnolian or Tournefortian level, not an Adansonian one. [Needham's original footnote: Where the taxonomy of natural families is concerned, it is better to avoid the term 'Linnaean'. To speak in this way is not to imply that the Chinese felt the need for a formalised system in the manner of Tournefort, but they perceived very clearly the relationships between plant genera, even though these were often 'submerged' within their oecological and physiological classification.]

By adopting an anthropological point of view of the history of botanical knowledge, one can supply a response to those two examples. Before the 20th century, Chinese doctors and literati gardeners drew a fundamental separation in the plant world between grasses and trees, just as Tournefort did; and the notion of botanical families existed no more for them than it did for Tournefort. Nevertheless, one crucial difference between Tournefort or Magnol and Li Shizhen is that the former two had both proposed a method that made it possible to classify plants – that is to say, position them in one place and one place only – within a whole collection by rigorously following the hierarchy of criteria on which their methods were founded. In the case of Li Shizhen and some of his European contemporaries (as we shall see later on), their classifications were essentially subjective and not at all deductive.

The ways in which Li Shizhen and Tournefort each present hemp provide a good illustration of the difference between their respective approaches.

Li Shizhen: *Ben cao gang mu* (1975–81, Volume 3, p. 1444)

grain section, *gu bu* 穀部.

Hemp/barley/wheat/rice category – *ma-mai-dao lei* 麻麥稻類.

Correct name: *ma* 麻.

Next comes a list of seven synonyms and references to their sources. Then Li Shizhen cites several authors to indicate that hemp is widely cultivated, that the plant is peeled and its seeds are harvested. He adds,

There are a female and a male. The male is called *xi* 梟, the female *ju* 苴. A thick stem, like sesame, long, narrow leaves like those of *yi mu cao* 益母草 [Chinese motherwort, *Leonurus sp.*], seven or eight to a branch. In the fifth and sixth months, delicate yellow flowers open and form ears, then the fruits are formed, resembling coriander seeds. They can be used to make oil. The skin is peeled to make hemp. The stem is white with parts that bulge. Can be used as candlewick.

There then follows a lengthy explanation to distinguish male and female seeds. Then comes a long chapter devoted to the medicinal uses of the various parts of the plant (Fig. 2).

Now let us consider what Tournefort writes (1719, Volume 1, pp. 501–35):

Classis xv. De Herbis et Suffruticibus, Flore Apetalo seu Stamino.

Sectio vi: De Herbis flore apetalo, quarum aliae in eodem genere floribus, aliae vero fructibus plerumque donantur.

Genus v. Cannabis. Hemp [see Fig. 3].

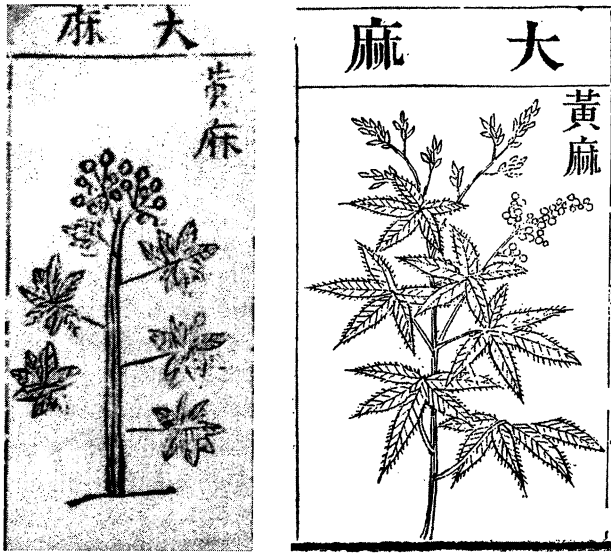


Fig. 2. Hemp (*da ma* 大麻, *Cannabis sativa* L.), from *Ben cao gang mu*: (a) from the first edition (1596); (b) from the reproduction of the 1885 edition (1965).

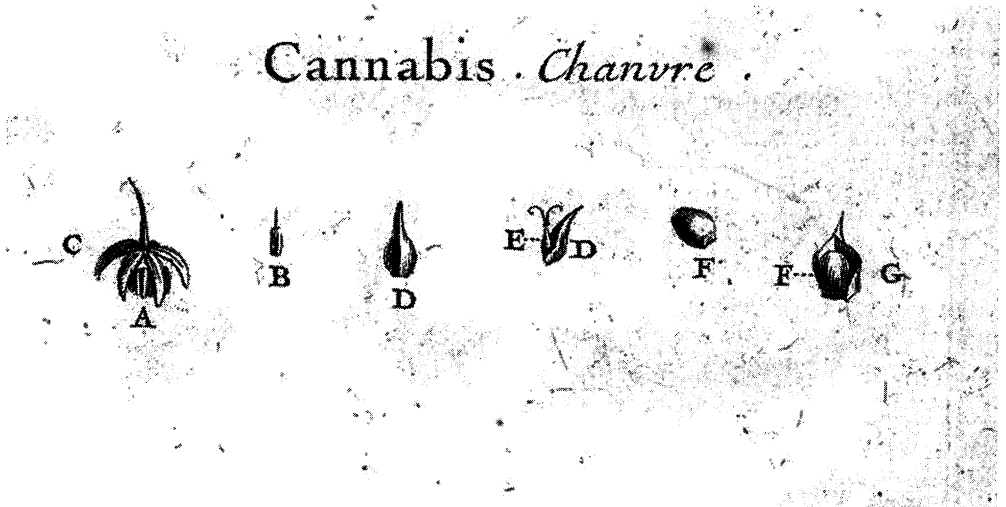


Fig. 3. Hemp, from *Institutiones Res Herbariae* (1719), by de Tournefort (Volume 3, Tab. 309).

Cannabis est plantae genus, flore A apetalo, plurimis scilicet staminibus B calyci C insidentibus constante, & sterili, ut monet Caesalpinus: Embryones enim E, D iis speciebus *Cannabis* innasci solent quae flore carent, abeuntque deinde in capsulam G semine foetam subrotundo F.

Cannabis species sunt

Cannabis sativa C. B. Pin. 320. *Cannabis mas* J. B. 3. 447. *Cannabis saecunda* Dod.
Pmpt. 535.

Cannabis erratica C. B. Pin. 320. *Cannabis faemina* J. B. 3. 447. *Cannabis sterilis* Dod.
Pmpt. 535.

Cannabis Africana, procerior, semine minori.

To my mind, these examples speak for themselves. Between Tournefort and Li Shizhen there is no difference of level within the same scientific domain, rather a difference in the nature of two different concepts for the study of plants.

My realisation of this logically led me to consider another important element in Joseph Needham's thinking. This was what he called 'the fusion point', which he defined as follows: 'when, in history, a particular science in its Western form fuses with its Chinese form so that all ethnic characteristics melted into the universality of modern science'.³¹ This is a particularly delicate problem. Joseph Needham writes as follows:

The fusion point in botany did not occur until about 1880 ... then there began to be Chinese botanists who could speak the language, could talk about Linnaean families and natural families, men who understood, like European naturalists, the function of the flower and what the microscope could reveal of plant morphology. This was the time too at which centred the great effort of many investigators, indispensable for further development, to establish correlation as complete as possible between the Chinese traditional plant names and the Linnaean binomials. Thus one might say that it was not before 1880 that the fusion point took place in botany, and a decade or so later might be a better guess.³²

In 1858, a book entitled *Zhiwuxue* 植物學 (Botany) was published in Shanghai by the London Missionary Society Press (Shanghai mohai shuguan 上海墨海書館). This book in eight chapters had been written by a famous mathematician, Li Shanlan 李善蘭 (1811–82), in collaboration with two missionaries, Alexander Williamson (1829–90) for the first seven chapters, and John Edkins (1823–1905) for the last chapter. The book was a Chinese adaptation of *An Outline of the First Principles of Botany* by the famous English botanist John Lindley (1799–1865).³³ An investigation into the books on botany published in China in the wake of Lindley's reveals that most are the work of foreigners and the first to be written by a Chinese author, Ye Lan 葉瀾, was a rhymed text of popularisation, probably published after 1895. However, none of those texts, all written by non-botanists, could enable anyone to practise botany or even simply to identify plants. In truth, the first Chinese botanists were former students who had been educated abroad, mostly in Japan, the United States or Europe, who began working in their own country after 1910. As one of them, Professor Hu Xiansu 胡先驕, wrote in 1937, 'the development of modern botany came about after the Republic ... In truth, only after 1916 did botanical research and collections progressively get under way'.³⁴

³¹ See Needham (1976, p. 202).

³² See Needham (1967, pp. 85–6; 1971, pp. 400–1); SCC Volume 7, Part II, p. 35.

³³ See Pan Jixing (1984).

³⁴ See Métaillé (2001c, p. 329).

Taking this situation partially into consideration, Joseph Needham wrote,

Down to that time [1880] Chinese botany continued on its classical way. The naming, classifying and describing of plants went on along traditional lines. Even as late as 1848 the indigenous style persisted in the important work of Wu Qijun 吳其濬 called the *Zhiwu ming shi tu kao* 植物名實圖考 (Researches on the Illustrations, Realities and Names of Plants). Though written at such a recent date, this splendid and well-illustrated treatise was entirely traditional in character and did not take any account of the advance in botany which had been made by Camerarius and Linnaeus.³⁵

It is hard to see what kind of fusion would have been possible between the contents of such a book, a great work of traditional botany that was remarkable in many respects, and modern botany. The earliest young Chinese botanists, all trained abroad, had learned a new discipline that broke away from the works of traditional pharmacology on *materia medica*, *ben cao* 本草. The only partial continuity was of a linguistic nature, for botanical terminology and nomenclature were to a large extent derived from whatever the ancient texts had to offer, and in the process a pioneering and fundamental role was played by Japanese scholars.³⁶

To sum up: I consider the ancient Chinese texts relating to plants to constitute a corpus representative of a particular scientific domain but not clearly formalised by those working in this field. The study that I have produced is that of something unnamed but abundantly practised; and I have carried it out in the manner of an ethnobotanical anthropologist whose informants were not living people but texts that were equally rich sources of information. With the obvious exception of my recourse to botanical identifications using Linnaean binomes, which I have indicated where possible, the present work will not be referring to modern botany, so as to avoid any distortion in the grasp of all the different elements that have enabled me to reveal what I regard to be an autonomous and original domain that may be called 'traditional Chinese botany'.

Finally, conscious of continuing the groundwork on a vast domain in the wake of the considerable achievements of Emil Bretschneider in the late 19th century and, one hundred years later, those of Joseph Needham and Lu Gwei-djen, my method has been to favour the presentation of sources and to include many translations, so as to offer information on both the content and the form of these texts. To me, it seems important for non-sinological readers to be able to appreciate the development of the thought of the literati, the crucial role that citation plays in their reasoning, as does their way of delivering evidence by constantly comparing contemporary experience and references to those of the past. As a result, the present book no doubt has an encyclopaedic aspect that I in no way regret. It does not claim to present a definitive history of the relations between human society and the plant world in China. Rather, thanks to the richness and diversity of the documents that it introduces, it aims to encourage ongoing research. I regard my work that is reflected in the pages that follow as an essay on ethnobotanical history.

³⁵ See Hu Xiansu (1937, p. 192).

³⁶ See the analysis of this text in the Conclusion to this volume.

(f) THE SOURCES OF TRADITIONAL BOTANY AND THE VARIOUS CLASSIFICATIONS

(1) TEXTS OF AN ENCYCLOPAEDIC NATURE

These texts of an encyclopaedic nature are particularly representative. They consist almost exclusively of compilations of writings relating to plants. Some form autonomous works; others are parts of vaster encyclopaedias. However, what they have in common is that they are certainly not botanical works in the modern sense of the expression; rather, they are anthologies in which the selected texts all relate to plants, or rather to the presence of their names. These texts manifest great eclecticism on the part of their authors and, as we shall soon see, they are taken from works belonging to a wide variety of genres. I have chosen to present them all together, in chronological order, beginning with the chapters devoted to plants in the encyclopaedia that was to serve as a model to many later works. This first work is the *Yi wen lei ju* 藝文類聚 (Art and Literature Collected and Classified).

This encyclopaedia consisting of one hundred *juan* 卷 was compiled by a group of literati placed under the direction of Ouyang Xun 歐陽詢 (557–641) at the instigation of the founder of the Tang dynasty, Emperor Gao Zu 高祖. The purpose of this undertaking was to collect together the texts or parts of texts recognised for their literary value, in order to provide models of reference for the writing of essays. The work was completed in 640. Extracts from over 1,400 works are regrouped into forty-seven thematic sections, the titles and classification of which reflect a particular kind of organisation of the universe, as is suggested by Yamada Keiji.¹ Of the one hundred *juan* included in this collection of citations, the twenty-one last ones concern fires, plants, silks, minerals, animals, phenomena of good omen and calamities. *Juan* 81 and 82 make up the section on aromatic and medicinal herbs, *yao xiang cao bu* 藥香草部; *juan* 85 is divided into two sections, on the one hand the ‘one hundred grains’, staple foods, *bai gu bu* 百谷部 and, on the other, silk tissues; *juan* 86 and 87 are devoted to fruits, *guo bu* 果部; and finally *juan* 88 and 89 concern trees, *mu bu* 木部.

Each of the rubrics within these sections presents two groups of citations. The first group consists of short texts recording anecdotes and facts; the second collects together poetic and literary writings, classified according to genre. Although most of these texts are made up of poems, *shi* 詩; recitatives, *fu* 賦; and memoirs, *qi* 啟, one also finds songs, *ou* 謳; eulogies, *song* 頌; panegyrics, *zan* 讚; letters, *shu* 書; documents addressed to the emperor, *biao* 表; memorials to the throne, *jian* 箋; and imperial edicts, *zhao* 詔.

¹ See Yamada Keiji (1995, pp. 5–10).

The names that are listed at the top of the whole collection of sections concerning plants number 140. These names are of three types. Some have specific meanings, others generic ones and yet others designate groups of plants that are defined by the way that they are used. 'Specific' and 'generic' should be understood to be folk categories, not botanical species or genera,² although it is sometimes possible to identify a name with a botanic species. The names that do designate botanical species are the least numerous. They are usually plurisyllabic, such as *shao yao* 芍藥, meaning 'peony'.³ Most of the other names of plants, whether monosyllabic or plurisyllabic, do not exclusively designate a precise botanical species but have a wider sense. Depending on the geographical or cultural context, they would designate a botanical species in a given locality, but also possess a generic meaning. Thus *jì* 薺, which today designates 'shepherd's purse',⁴ a ubiquitous plant, cultivated and much appreciated as a vegetable in southern Jiangsu and in the Shanghai region, used to designate a general collection of plants the leaves of which were consumed as vegetables in soups. This group is characterised by the sweetness of the plants of which it consists, as we are reminded by the *Shi jing*,⁵ and also by the shape and small size of their fruits, the silicles, which are even given a name of their own, *cuo* 差 in the *Er ya*.⁶ As well as shepherd's purse, this group includes other plants from the Crucifer (Brassicaceae) family.⁷ Similarly, although *kui* 葵 can be identified with a species of mallow, *Malva verticillata* L.,⁸ the term also possesses a generic meaning that we may express as 'a plant with fat leaves that is consumed as a vegetable'. So, as a generic term with a variety of meanings, it has also been used to name other plants, such as basella, *luo kui* 落葵;⁹ black nightshade, *long kui* 龍葵 or *ku kui* 苦葵;¹⁰ or even other Malvaceae, *huang kui* 黃葵,¹¹ *qiu kui* 秋葵.¹² In the second group we find terms such as 'grasses', *cao* 草; 'gourds', *gua* 瓜; bamboos, *zhu* 竹; and lianas, *teng* 藤. Finally, the terms that refer to a third group and that designate categories of usage are 'medicinal products', *yao* 藥, which include both plants and minerals; 'aromatics' *xiang* 香; and vegetables, *cai shu* 菜蔬, and to these should be added items named in the work's various sections *bu* that concern plants, *bai gu* 百穀, the 'one hundred grains'; *guo* 果, fruits; and *mu* 木, trees. This, then, is a form of complex classification, an ethnobiological classification in which biological and cultural categories are closely associated.

² For a presentation of folk classifications, see Berlin (1992); Ellen (1993).

³ *Paeonia lactiflora* Pall. (anon. (1977b/1412; 2225) (= *P. albiflora* Pall. (Jia, Jia 1955/1424)).

⁴ *Capsella bursa-pastoris* L. Medic.; anon. (1977b/3328).

⁵ *Shi wei tu ku qi gan ru ji* 誰謂荼苦其甘如薺, 'Whoever says that Sow Thistle is bitter, it is as sweet as the *ji*'. *Shi jing*, poem 'Gu feng' 谷風, of the Bei (Feng) 邶 in the Guo Feng 國風. English version of author's French translation. See Couvreur (1896, p. 40); Xiang Xi (1986, no 35, p. 702).

⁶ See Bretschneider (1893, *BS*, no 103, p. 65).

⁷ See Haudricourt and Métaillé (1994, pp. 386–91); Aodeliguer and Mei Taili (1996).

⁸ See Li Hui-lin (1969); anon. (1977b/1536). ⁹ *Basella rubra* L.; anon. (1977b/4821).

¹⁰ *Solanum nigrum* L.; anon. (1977b/1286). ¹¹ *Abelmoschus moschatus* (L.) Medic.; anon. (1977b/4156).

¹² *Abelmoschus manihot* (L.) Medic.; anon. (1977b/4254).

Now let us consider the text that appears in each of the entries. It is made up of a mosaic of citations. We should not forget that it is, above all, a matter of providing literary examples for didactic purposes. Through the volume of each of its parts, the composition of the text thus reflects either the importance that the compilers attach to the plants cited or else, perhaps more probably, the cultural importance of the plants that, in fact, are the most cited in literature. In any case, it is noticeable that the compilers do not display any particular concerns that could be described as 'naturalist'. For example, the sources seldom mention morphological details but instead provide information above all about the regions where such and such a plant is to be found or about the ecological conditions that favour it: mountainsides, deep valleys or sunny slopes. In the case of cultivated plants, there is sometimes a mention of varieties, for instance on the subject of chestnut trees, *li* 栗,¹³ in a citation from the *Xi jing za ji* 西京雜記 (Miscellaneous Records of the Western Capital) by Ge Hong 葛洪,¹⁴ which we shall come across again in the chapter devoted to horticulture.

The authors of the *Si ku quan shu* 四庫全書 consider the *Chu xue ji* 初學記 (Entry into Learning) and the *Yi wen lei ju* to be the best encyclopaedias completed under the Tang.¹⁵ The *Chu xue ji*, compiled by imperial order under the direction of Xu Jian 徐堅 (+659–729) and completed in +727, is also a collection of citations initially designed for the instruction of the children of Emperor Xuan Zong 玄宗, who reigned from +712 to 756. The work as a whole, in thirty *juan*, is divided into twenty-three sections that cover 133 subjects.¹⁶ In accordance with the same schema as that of the last-mentioned collection, the parts concerning plants and animals are positioned at the end. Overall, not many plants are cited, so we can see which were those that most attracted the attention of the literati. It is even possible that the order in which they are mentioned in the text reflects a classification according to their cultural importance. The 'grasses section', *cao bu*, is appended to 'the section of precious things', *bao qi bu* 寶器部, in *juan* 27. It comprises seven entries, the 'Five Grains', *wu gu*; the *Cymbidium* orchids, *lan* 蘭; the chrysanthemums, *ju* 菊; the lotus, *fu rong* 芙蓉; the *Hemerocallis*, *xuan* 萱; the *ping* 萍;¹⁷ and finally the lichens and mosses, *tai* 苔, also known as 'clothing of the rocks', *shiyi* 石衣, or 'hair of the rocks', *shifa* 石髮. The following *juan* forms the 'fruits and trees section', *guo mu bu* 果木部, which contains eighteen entries, beginning with fruit trees. The first fruit tree is the plum tree, *li* 李,¹⁸ several varieties of which are named, again based on the *Xi jing za ji* by Ge Hong. Then come an apple

¹³ *Castanea sp.* We now know of three species of chestnut in China the fruits of which are eaten. The principal one is *Castanea mollissima* Bl. (= *C. bungeana* Bl.), *banli* 板栗. The two other species are *C. seguinii* Dode (= *C. davidii* Dode), *maoli* 茅栗, and *C. henryi* Rehd. and Wils. (= *C. vilmoriana* Dode), *zhenzhuli* 珍珠栗. See Kong Xu (1987, pp. 776 ff.) and Yu Dejun (1982, pp. 252 ff.).

¹⁴ Liu Xin (?–23) of the Western Han was for a long time considered to be the author of this collection of facts and anecdotes. The paternity of the work is now attributed to Ge Hong (284–364) (anon., 1979a, p. 1369).

¹⁵ Teng and Biggerstaff (1971, p. 86).

¹⁶ Teng and Biggerstaff (1971, p. 86).

¹⁷ Today, this term designates the water clover, *Marsilea quadrifolia* L., but a number of examples cited suggest, rather, that it is a generic term that also designates several other small, floating, freshwater plants.

¹⁸ *Prunus salicina* Lindl.; anon. (1977b/2247).

tree, *nai* 奈;¹⁹ the peach tree, *tao* 桃;²⁰ a cherry tree, *yingtao* 櫻桃;²¹ the jujube tree, *zao* 棗;²² a chestnut tree, *li* 栗;²³ a pear tree, *li* 梨;²⁴ the king orange, *gan* 柑;²⁵ the tangerine tree, *ju* 橘;²⁶ the Japanese apricot tree, *mei* 梅;²⁷ the pomegranate tree, *shiliu* 石榴;²⁸ and the gourds, *gua* 瓜.²⁹ The 'tree section', *mu bu*, follows, annexed to the previous section. It comprises the following trees: the pine, *song* 松; the cypress, *bai* 柏; the *Sophora*, *huai* 槐;³⁰ the *tong* 桐 trees;³¹ the willows, *liu* 柳; and finally the bamboos, *zhu* 竹. Each entry is presented in a systematic fashion. First, arranged under the title *xu shi* 序實 (Exposition of the facts), are citations relating to names and sometimes to the various plants that share the same name; then, more generally, under the title *shi dui* 實對 (Matching facts) come parallel statements, chiefly of stylistic interest. Poems are also cited under the two rubrics *fu* 賦, recitatives, and *shi* 詩, 'poems'.

The third work that I have chosen, the *Tai ping yu lan* 太平御覽 (Tai Ping Reign-period Imperial Encyclopaedia), is considerably more voluminous than the first two. This encyclopaedia, completed in 983, consisting of one thousand *juan*, was also compiled on the orders of the Song Emperor Tai Zong, under the direction of Li Fang 李昉 (+925–96).³² This work, a collection of knowledge in the form of citations, contains over 5,000 entries, divided into fifty-five sections.³³ The last forty-nine *juan* principally concern plants, which are divided into seven sections, *bu*. These successively present trees, *mu* (10 *juan* and 132 entries); bamboos, *zhu* (2 *juan* and 39 entries); fruits, *guo* (12 *juan* and 75 entries); vegetables, *cai ru* 菜茹 (5 *juan* and 37 entries); perfumes, *xiang* 香 (3 *juan* and 41 entries), *materia medica*, *yao* (10 *juan* and 199 entries, 144 of which are names of plants); 'One hundred grasses', *bai hui* 百卉 (7 *juan* and 122 entries). In all, nearly 590 names of plants appear in the entries. Although this number represents a considerable increase over the previous two works, the text corresponding to each entry has lost its explicit internal structuring into two major themes and according to a variety of literary forms. Instead, this work presents a purely chronological classification of the citations of which it is composed.³⁴

One feature common to all these three works is that, being formed solely of citations, they have preserved more or less important parts of numerous texts that have disappeared, so they have constituted a valuable source for attempts to reconstruct lost works. On the other hand, references relating to plants occupy no

¹⁹ *Malus pumila* Mill.; anon. (1977b/2674). ²⁰ *Prunus persica* (L.) Batsch.; anon. (1977b/3644).

²¹ *Prunus pseudocerasus* Lindl.; anon. (1977b/5429). ²² *Ziziphus jujuba* Mill.; anon. (1977b/5292).

²³ *Castanea mollissima* Bl.; anon. (1977b/3731). See the translation of the text for this entry in SCC Volume 6, Part 1, p. 210.

²⁴ *Pyrus bretschneideri* Rehd.; anon. (1977b/4496). ²⁵ *Citrus reticulata* Blanco (= *C. nobilis* Lour.).

²⁶ *Citrus tangerina* Hort. ex Tanaka. On the citruses in ancient China, see SCC Volume 6, Part 1, pp. 362–77.

²⁷ *Prunus mume* (Sieb.) Sieb. et Zucc.; anon. (1977b/0935). ²⁸ *Punica granatum* L.; anon. (1977b/1479).

²⁹ In this context the term *gua* designates essentially the cucurbits that can be consumed when young, the peel of which hardens when the plant reaches maturity and can be used for technical purposes.

³⁰ *Sophora japonica* L.; anon. (1977b/5078). ³¹ See below, pp. ***, for the study devoted to this genus.

³² Teng and Biggerstaff (1971, p. 88). ³³ Teng and Biggerstaff (1971, p. 88).

³⁴ Teng and Biggerstaff (1971, p. 88).

more than a minor part, mostly in the last sections of the text. It was not until the period of the Southern Song (1127–1279) that the first documentary treatise devoted exclusively to plants appeared: the *Quan fang bei zu* 全芳備祖 (The Complete Chronicle of Fragrances).³⁵

The author, Chen Yong 陳詠 (*zi* 字: Jingyi 景沂; *hao* 號: Feidun 肥遯 or Yuyizi 愚一子) was a native of Tiantai 天臺³⁶ in Zhejiang and held administrative duties in the zone of the present-day provinces of Jiangsu and Zhejiang, under the Southern Song. The compilation of the major part of the work seems to have been completed in 1225,³⁷ when the author was in his thirties. The work was then presented to the throne but it was not until around 1256³⁸ – the date of the author's preface (another preface, by Han Jing 韓境, dates from 1253) – that it was printed, after being revised by Mu Bohe 穆伯和.³⁹ There do not appear to have been many reprints and there are virtually no mentions of it in literature,⁴⁰ although the text was repeated in the *Si ku quan shu*. Furthermore, up until its recent republication, only a few manuscript copies of it were known in China⁴¹ and in the Library of Congress in the USA, and some fragments of the Song edition that were preserved in the library of the Ministry of Culture in Japan. Nevertheless, its importance is by no means negligible for, along with treatises on *materia medica*, *ben cao*, and works on agriculture and horticulture, it inaugurated a new genre: that of encyclopaedic collections of knowledge and references specifically relating to plants.⁴² The *Quan fang bei zu* is a collection in two parts. The first, *qian ji* 前集, in twenty-seven *juan*, forms one single section, *bu*, devoted exclusively to flowers, *hua* 花. The second part, *hou ji* 後集, in thirty-one *juan*, is subdivided into seven sections that successively address fruits, *guo* (nine *juan*); grasses, *hui* (three *juan*); grasses, *cao* (one *juan*); trees, *mu* (six *juan*); grains and mulberry trees, *nong sang* 農桑 (three *juan*); vegetables, *shu* (five *juan*); and medicinal plants, *yao* (four *juan*).

The text as a whole, which contains no illustrations, is arranged, according to the author's preface, into 400 entries, *men* 門.⁴³ Each entry corresponds to the name of a plant or a part of a plant and introduces a text of varying length that is subdivided

³⁵ Friendly co-operation between China and Japan made it possible in 1982 for Nongye Chubanshe (Agricultural Press) in Peking to publish a text based on two sources: the fragments of a Song edition preserved in Japan and a more complete manuscript in the Peking library. It is, however, a pity that it was not a critical edition. See Chen Jingyi (1982).

³⁶ Still Tiantai in Zhejiang today.

³⁷ However, on the subject of the camphor laurel, *yu zhang* 豫章, in *juan* 19, there is a quite long text dated 1256, certainly by Chen Jingyi himself, that ends with a 'Note on the Old Man in the shade of the camphor laurel', *zhang yin lao ren ji* 樟陰老人記 (Chen 1982, p. 1279).

³⁸ See the preface to the new edition, Liang Jiamian (1982). ³⁹ Liang Jiamian (1982, p. 2).

⁴⁰ Li Shizhen, in his bibliography of one thousand titles at the beginning of the *Ben cao gang mu*, does not mention it; see Xu Wenxuan and Xiong Ruoli (1982). However, the *Si ku quan shu cong mu* recognises this text's merit in having noted and preserved extracts from lost works that are to be found nowhere else (see Yong Rong et al. 1965, p. 1150).

⁴¹ Library of Peking, Library of the University of Yunnan, Agriculture Library of Southern China.

⁴² See Liang Jiamian (1982).

⁴³ In actual fact, the total of the names of plants cited as entries is considerably lower (around 300). Does this difference prove that the initial text was changed? It is not possible to answer that question precisely; see the preface to the new edition, Liang Jiamian (1982). All the same, if one takes into account the varieties named for

under two major rubrics, on the one hand *shi shi zu* 事實祖, the 'facts', on the other the literary texts: *fu yong zu* 賦詠祖, poetic texts, and *yue fu zu* 樂府祖, elegies and recitatives. The first of those two rubrics in its turn covers three others: *sui lu* 碎錄, 'fragmentary notes'; *ji yao* 紀要, 'essential memoirs'; and *za zhu* 雜著, 'diverse writings'. The poetic texts that form the second part are classified according to ten different genres.

Under the heading 'fragmentary notes', we find the origin of the name cited at the start of the entry, its synonyms and, in many cases, details relating to the description of the plant and its classification. Under 'essential notes' and 'diverse writings' come citations that more precisely concern the nature, origin, cultivation and uses of the plant, along with anecdotes, often of a mythical nature, that are associated with it.

The division of references into these two major parts clearly testifies, as the authors of the *Si ku quan shu zong mu* claim,⁴⁴ that Chen Jingyi was inspired by the *Yi wen lei ju*, mentioned above. The author clearly expresses his desire to investigate the nature of things, as can be seen from reading his preface.⁴⁵ All the same, one may well wonder whether the desire 'to supply material for literary purposes', through the abundance of citations offered to readers, was not also one of the underlying motives of this work designed in the image of its model.⁴⁶

Quantitatively, it is the poetic texts that form the major part of this work, which thus constitutes a veritable anthology that offers an excellent source to anyone interested in Chinese sensitivity (up until the Song period) when faced with the plant world. Without belittling this aspect of the work, I have essentially concentrated on an analysis of the information provided by the section under the rubric 'facts', which is made up of some 1,600 citations from roughly four hundred texts (some of which now exist solely thanks to what is preserved in this collection).⁴⁷ This information is not distributed equally among the entries as a whole but, *grosso modo*, in a decreasing order that diminishes from the first entries to each section to the last ones, for which the rubric 'facts' may even be absent.

The first point to make is that many of the works of reference are not made up of treatises devoted to plants but consist, rather, of texts of a variety of literary genres.⁴⁸ The second is that the three sections under this rubric are differentiated above all by the nature of the sources cited and, consequently, by their type of information. Thus encyclopaedias, Confucian classics, Daoist texts, horticultural

certain plants, such as *mei*, the Japanese apricot; *mu dan*, the tree peony; and *li zhi*, the lychee, that total of four hundred is certainly close.

⁴⁴ See p. 1150 in the later 1965 edition (Yong Rong et al., 1965). ⁴⁵ See p. 5 above.

⁴⁶ See Teng and Biggerstaff (1971, p. 86).

⁴⁷ It is interesting to note that only some of them are to be found in the bibliography of 1,148 titles of works provided by Bretschneider (1881) as the sources of his researches, in Chapter 3 of the first volume of the *Botanicon Sinicum*, in which, furthermore, the *Quan fang bei zu* is not mentioned.

⁴⁸ However, compared to a large number of titles that provide no more than one or two citations, the work that is the most systematically cited is the *Shen nong ben cao jing* – simply referred to as *Ben cao* or as *Shen nong jing*. There are also frequent borrowings from the *Nan fang cao mu zhuang*. On this work, see SCC Volume 6, Part 1, pp. 447 ff.; and also Bai Hongxin (1990).

monographs and local annals are characteristic of the first section (*sui lu*); prefaces to poetic works, personal notes made by literati, and biographies provide the basis for the second section (*ji yao*); and essays in verse in the *fu* genre constitute the principal source of the *za zhu*.

Readers may assess the interest that this work holds for a scientific enquiry, judging by the information provided for the identification of the barringtonia *yu rui* 玉蕊 by Joseph Needham and Lu Gwei-djen,⁴⁹ and we shall be returning to this aspect of the work. Therefore, let us for the time being limit ourselves to considering the problem of the classification of plants.

In his preface, Chen Jingyi explains that he has striven to be exhaustive only in the case of the entries⁵⁰ relating to flowers, *hua*; grasses, *cao*; fruits, *guo*; and trees, *mu*, 'all of which belong to plants although they are not all the plants'. When comparing the contents of these various rubrics, one notices that the same plant may be taken into account several times. For instance, the following plants appear first as 'flowers', then as 'fruits':⁵¹ the Japanese apricot, *mei*; the peach, *tao*; the Japanese plum, *li*; the apricot, *xing*;⁵² and the lotus,⁵³ which appears with three different names, *he hua* 荷花, *lian* 蓮 and *ou* 藕, which designate, respectively, the flower, the fruit and the rhizome; then the tangerine tree, *ju*; the pommelo tree, *you* 柚;⁵⁴ the Chinese cherry, *ying tao*; and the pomegranate, *shi liu*. Furthermore, the tea plant⁵⁵ is cited first for its flower, *cha hua* 茶花, then as a medicinal plant; bamboos figure among the trees, their shoots *sun* 筍 among the vegetables; finally, *Paulownia* are cited first as flowers, then as trees.⁵⁶ The above few examples show that one particular entry in the encyclopaedia does not necessarily correspond to a botanical species and that the emphasis is placed, rather, on the connections between names and the things named; that is to say, between what classical Chinese terminology calls, respectively, *ming* and *shi*. In other words, the author's task is not to present new plants to which he has ascribed names, but to take note of existing words and try to illustrate them by examples drawn from literature. It is also clear that the division of the text into eight sections, *bu*, which is adopted in this work, is primarily for practical purposes; for the division of the plant world is, as the author sees it, that of the four categories mentioned in the preface: flowers, grasses, fruits and trees. Up until now we have simply taken over what the text clearly says about the classification of the higher levels. Is it possible to draw complementary information concerning the very form of the different parts? The first obvious fact is without doubt the

⁴⁹ See *SCC* Volume 6, Part 1, p. 430.

⁵⁰ It should be remembered that I am translating *men* 門 as 'entry' rather than as 'species'. The latter would be inaccurate since various parts of the same plant may figure as so many different entries.

⁵¹ In the first case, the entry is systematically formed by the name of the plant followed by *hua*, flower. In the second, only the name of the plant is given. Thus, *mei hua* and *mei* for the Japanese apricot, etc., with the exception of the lotus, which is named *he hua* when referring to the flower, but *lian* or *ou* if it is a question of the seed or the rhizome when the latter is regarded as a 'fruit'.

⁵² *Prunus armeniaca* L. (= *Armeniaca vulgaris* Lam.); Fèvre and Métaillé (2005, p. 514).

⁵³ *Nelumbo nucifera* Gaertn.; Fèvre and Métaillé (2005, p. 272).

⁵⁴ *Citrus grandis* (L.) Osbeck; Fèvre and Métaillé (2005, p. 552); (= *C. maxima* (Burm.) Merr.); Uphof (1968, p. 134).

⁵⁵ *Camelia sinensis* (L.) Kuntze (= *Thea sinensis* L.); Fèvre and Métaillé (2005, p. 44). ⁵⁶ See below, pp. 62–3.

considerable importance assigned to 'flowers', the section of which is the first to be mentioned and which incorporates over one-third of the names cited and, in volume, represents half of the total text. This group contains herbaceous plants as well as ligneous/woody ones and the criterion that dictates the order of the first twenty-four plants cited is their ornamental and certainly cultural importance,⁵⁷ while the plants that follow may have been grouped together because of their agreeable perfumes.⁵⁸

As for the fruits, which come next, one is bound to notice that they are grouped together so that certain sequences correspond to combinations of plants that bear a natural resemblance to one another and that, indeed, appear to belong to the same botanical families as are recognised today: Sapindaceae (two), Rutaceae (six), Rosaceae (five and three), while others mix together plants that are noticeably different from one another but the ecology of which is similar, such as Nymphaeaceae and Hydrocaryaceae, or else plants with fruits that present a certain analogy to one another, such as pine nuts and ginkgo nuts, for example, in cases where the edible part of plants is being considered.⁵⁹

The next two sections are devoted to non-woody plants, *hui* 卉 and *cao* 草.⁶⁰ It is difficult to differentiate absolutely between the two, since the first entry for *hui* is *cao*. However, the nine others correspond to the names of aquatic plants or ones that grow in humid places, whereas that is not the case of the plants named in the *cao* section.

In one article,⁶¹ the *Quan fang bei zu* is described as 'China's first botanical dictionary'⁶² or even 'the world's first botanical dictionary'.⁶³ In view of the great

⁵⁷ The texts relating to these twenty-four plants represent 574 pages in the recent edition; that is to say, over one-third of the whole that is devoted to over 300 entries.

⁵⁸ We should not forget that the term *fang* 芳 that appears in the title initially meant 'perfumed plant', before it came to signify 'plant' in poetic texts. Nevertheless, since at the moment forty or so names have not yet been identified, we cannot pursue this analysis further. It should be pointed out that with the help of a single flora (Jia Zuzhang and Jia Zushan 1955), over 80 per cent of the names encountered in the *Quan fang bei zu* have been related to a plant; the group containing the greatest number of unidentified plants is that of 'flowers'.

⁵⁹ However, since the criteria for grouping are not explained by the author, my interpretation must, of course, be considered a hypothesis. We should also note that what is called the 'fruit' of the ginkgo is, from a botanical point of view, not a fruit, but a seed. See Lawrence (1951, p. 358).

⁶⁰ The definition for the term *hui* given by the modern *Xin hua zi dian* dictionary runs as follows: *cao de zong cheng* 草的總稱 – 'general name for grasses' (anon. 1965, p. 192), and the *Kangxi zi dian*, citing the *Shuo wen*, gives the same definition: *cao de zong cheng* – 'general name for grasses'. As for the definition of *cao*, also taken from the *Shuo wen*, it is symmetrical with the former: *zuo cao bai hui ye* 作草百卉也 – '[what] forms *cao* is all the grasses *hui*'.
⁶¹ See Xu Wenxuan and Xiong Ruoli (1982).

⁶² Here 'botanical' is understood in its modern sense.
⁶³ To justify this declaration, the authors draw a comparison with Valerius Cordus' *Historia Plantarum*, 'the first work to provide a systematic description of plants', which was 300 years later than the *Quan fang bei zu*. I myself cannot agree with that declaration since Valerius Cordus' work is of a different nature to Chen Jingyi's. Whereas the latter offers us a compilation of heterogeneous texts the aim of which is to illustrate what has been written about plants, the former responds to a theoretical concern to produce a non-analogical description of plants in a systematic manner, forming an original and homogeneous whole. In this way, Valerius Cordus introduces scientific diagnosis, whereas Chen Jingyi presents, in a practical form, the maximum number of literary citations on the subject of plants or the parts of plants. The first case thus presents us with a work that is a precursor of modern botany, whereas the second is more of an anthology of literary citations on the subject of plants. The term 'botanical' does not cover the same idea when it is applied to the *Historia Plantarum* as it does when it is applied to the *Quan fang bei zu*. On the place of Valerius Cordus in the history of Western botany, see

scientific value that the authors attribute to this work, they even suggest that this book should henceforth become the reference norm for botanical nomenclature in Chinese. But it seems to me that even though this book certainly possesses a documentary value, its intrinsic scientific value amounts to no more than that of the references cited. There is no homogeneity either as to time – with citations ranging from texts before the common era to texts by authors contemporary with Chen Jingyi or composed by himself – or as to genres, for technical passages are intermingled with mythological or poetic ones. The *Quan fang bei zu* is certainly a collection of great ethnobotanical interest, but it is not a botanical work in the modern sense of the expression – a fact that, however, in no way diminishes its interest for a botanist.⁶⁴ Nevertheless, even if Xu and Xiong note in particular the first appearance of *tai xian* used to designate a group composed of mosses and lichens, there is no indication that this reflects a kind of premonition of modern botany's notion of bryophytes. Rather, it is simply a manifestation of a procedure that is common in ethnobiological classification of the kind that the texts in classical Chinese suggest, namely the juxtaposition of two generic terms in order to designate a taxonomic group at a higher level, which we shall soon be analysing.⁶⁵ In effect, modern botanists have judiciously readopted this popular term, using it to construct the Chinese expression *tai xian zhi wu* 苔蘚植物, a translation of the Latin botanical term Bryophytae, which designates a subdivision of the plant kingdom.

There remains one important problem that needs to be tackled carefully, namely the identification of sources. I will approach it on one point only. In this work we find citations attributed to the *Nan fang cao mu zhuang* 南芳草木狀 and to the *Cao mu zhuang*; others to the *Nan fang cao mu ji* 南芳草木記 and some to the *Cao mu ji*; and also to the *Ji han ji* 稽含記 (The Notes of Ji Han) and to the *Ji han lu* 稽含錄 (Writings of Ji Han), the *Ji shi ji* 稽氏記 (The Notes of Mr Ji), the *Ji shi lu* 稽氏錄 (The Writings of Mr Ji), the *Jin ji han ji* 晉稽含記 (The Notes of Ji Han of the Jin) and even *Ji shi* 稽氏 (Mr Ji). When systematically comparing these citations⁶⁶ with the text of the *Nan fang cao mu zhuang* established by Li Hui-lin,⁶⁷ I realised that all the citations noted as *Nan fang cao mu zhuang* and *Cao mu zhuang* and also those attributed to Mr Ji (Ji Shi) or to Ji Han were also to be found, some with a few different details,

Greene (1983, Volume 1, pp. 369–415), Reed (1942, p. 65) and Morton (1981, p. 126). On his work, see Sprague and Sprague (1939). If one is absolutely determined to compare the *Quan fang bei zu* with a Western work, it would be more suitable to compare it, as André Haudricourt suggested to me, with the *De Vegetabilibus et Plantis* by Albertus Magnus, an author who is exactly contemporary with Chen Jingyi since he composed his books between 1250 and 1260 (Morton 1981, p. 93). The very different nature of the two works would alert one to a noticeable difference of approach to the plant world. On the work of Albertus Magnus, it is worth consulting Arber (1950, Chapter 3), Singer (1959, pp. 75–6), Greene (1983, Volume 2, p. 448), Pouchet (1853, pp. 297–308), Sprague (1933a; 1933b). For an account of my own point of view, expressed in Peking in November 1984, at the Institute of the History of Natural Sciences, see Luo Guihuan (1985).

⁶⁴ See also the passage on the *yu rui*, presented in *SCC* Volume 6, Part 1, p. 430. ⁶⁵ See pp. 91 below.

⁶⁶ Mei Taye (1990). For this, I used the recent edition of the *Quan fang bei zu*, with the aid of a microfilm of the manuscript preserved in the Peking Library.

⁶⁷ See Li Hui-lin (1979).

in Li Hui-lin's edition. On the other hand, while two of the passages taken from the *Cao mu ji* and the *Nan fang cao mu ji* are present in the modern edition of the *Nan fang cao mu zhuang*, the others are not included.⁶⁸ Finally, on the subject of *gan lan* 橄欖, the Chinese olive,⁶⁹ one passage from the text established by Li Hui-lin does figure in the *Quan fang bei zu*, but as a citation from another work by Liu Xun 劉恂, the *Ling biao lu yi* 嶺表錄異 (Strange Phenomena Observed in Guangdong); and, furthermore, the content is noticeably different. This brief example undeniably demonstrates the interest of the *Quan fang bei zu* when considered as a possible source for the reconstruction of ancient texts, and it certainly also gives some indication of the complexity of such a task.⁷⁰

To sum up, here is an extract from Swingle's Introduction to this work:

The *Chhuan Fang Pei Tsu* quotes extensively from the works of the Thang and Song dynasties that were still available at the time it was compiled. A translation made by Mr Michael Hagerty of the matter relating to the lichee shows that the *Chhuan Fang Pei Tsu* reproduces most of the text of the *Li Chih Phu* by Tshai Hsiang with certain variant readings not found in the numerous other texts of this agricultural classic dating from the middle of the eleventh century A.D. There is every reason to believe that a careful study of the *Chhuan Fang Pei Tsu* will bring to light much information regarding Chinese plants, both ornamental and useful, that was gleaned from works lost centuries ago and consequently not to be found in the modern Chinese encyclopaedias and reference books.⁷¹

It is in this same spirit that Wang Yuhu, despite holding 'that one cannot consider it to be truly a book on agriculture',⁷² does indeed include it in his bibliography since 'although the author did not at first have the idea of writing an agricultural treatise, this book truly does contain much material that is valuable from the point of view of modern agronomy'. That is not the case for the following text, which forms the last part of a general encyclopaedia and is of a definitely more aesthetic character.

The *San cai tu hui* 三才圖繪 (Universal Encyclopaedia) was composed during the second half of the 16th century by Wang Qi 王圻 and his son Wang Siyi 王思義. It was completed in 1607 but published after 1609, which is the date of the preface. Wang Qi (zi: Yuanhan 元翰; hao: Hongzhou 洪洲) was a native of Shanghai. Having attained the scholarly rank of *jin shi* in 1565, he held a number of important administrative posts. In particular, he was sent as an inspector to the provinces of Fujian and Sichuan. The work consists of 106 parts (*juan*) in fourteen sections, the last two of which are devoted, respectively, to animals, *niao shou* 鳥獸 (six *juan*), and plants, *cao mu* 草木 (twelve *juan*). The references to authors placed at the beginning of each *juan* suggest that Wang Qi conceived the plan of the work and began to

⁶⁸ In December 1983, an international conference was held in Canton on the problem of the authenticity of the *Nan fang cao mu zhuang*. The two theses put forward are well summarised in two articles. Ma Tailai (1978; 1990) convincingly shows that this is an apocryphal text, while Peng Shijiang presents a hypothesis that, for the supporters of the thesis of authenticity, justifies the first appearance of the text several centuries after its supposed date of composition. Readers interested in the problem of the *Nan fang cao mu zhuang* may refer to the work edited by Bai Hongxin (1990), which records all the interventions made by participants in the conference.

⁶⁹ *Canarium album* Raeusch; Jia Zuzhang and Jia Zushan (1955/0889) (= *C. sinense* Rumph.).

⁷⁰ See SCC Volume 6, Part 1, pp. 459, 532.

⁷¹ See Swingle (1925-6).

⁷² Wang Yuhu (1979), p. 101.

葡 萄



Fig. 4. Vine (*pu tao* 葡萄, *Vitis vinifera* L.), from *San cai tu hui* (1609, *cao mu shi yi* 草木十一, 18a). Cf Wang Qi and Wang Siyi (1988, Volume 3, p. 2518).

compile it with the help of his son, who carried on the task on his own from the thirty-fourth *juan* onward. The originality of the part that interests us here, as compared to the rest of the literature on plants, is the form adopted, in which illustrations and texts are strictly associated. In general, each entry is illustrated by a drawing that occupies one page (Fig. 4), as does the corresponding text. In some cases a brief text appears on the illustrated page only. The whole section on plants, *cao mu*, is divided into six categories: grasses, *cao*; trees, *mu*; vegetables, *shu*; fruits, *guo*; grains, *gu*; and ornamental flowers, *hua hui*. Over half of the 541 entries (292) concern grasses, divided into six *juan*. All the other plants are divided into two *juan* for seventy-nine trees, one *juan* for sixty-three vegetables, one *juan* for forty fruits and twelve grains, and the last *juan* for fifty-five flowers. Given that a single entry corresponds either to a botanical species or to a botanical genus or to larger plant groupings such as bamboos, rather than to 'species' or 'genera', terms that possess a precise botanical sense that is here anachronistic, I have chosen to use the notion 'generic-species', which has been suggested in anthropological works on folk

classifications.⁷³ In actual fact, these 541 entries refer to a far greater number of botanical species or cultivars, because the text frequently indicates the existence of several *zhong* 種 or *pin* 品 that are differentiated either by the colour of the flowers, the flowering period or the appearance of fruit and the nature or form of those fruits.

Each text starts systematically by localising the regions in which the plants grow. Next comes a description of the plant, a description that often covers several species or varieties that are briefly mentioned. Finally the nature, taste and medical or other uses are noted. The text does not refer specifically to the sources of all this information. It is clear that most of the indications concerning geographical localisation and descriptions are simply taken over from the *Ben cao tu jing* 本草圖經 together with, in the case of pharmaceutical complements, extracts from the *Shen nong ben cao jing* 神農本草經 and the *Ming yi bie lu* 名醫別錄. The modifications made to the original text, as it is cited in the *Zheng lei ben cao* 證類本草, for example, are for the most part shortened versions seemingly introduced in order to fit the text into a single page.

The text contains no original contributions from the authors of the compilation in relation to their sources. This is a far cry from the procedure of a writer such as Li Shizhen who,⁷⁴ in roughly the same period,⁷⁵ almost systematically analyses the point of view of his predecessors, often with a critical eye. In this way, thanks to the intervention of the *San cai tu hui*, an 11th-century text, now lost, the *Ben cai tu jing*, was partially reconstructed, without commentaries, in the early 17th century.⁷⁶

The next work appeared shortly after this.⁷⁷ Wang Xiangjin 王象晉 (*zi*: Jinchen 蓋臣; *hao*: Kangyu 康宇; *zi hao*: Haoshengjushi 好生居士), a native of Xincheng 新城 – today Huantai 桓臺 – was a connoisseur of gardens in Shandong, who received his doctorate in 1604. It took him ten years of observations and reading to compose his *Qun fang pu* 群芳譜 (Treatise on Plants), also known as *Er ru ting qun fang pu* 二如亭群芳譜 (Treatise on the Plants of the Er Ru Pavilion) in twenty-four *juan*; its postface was dated 1621.⁷⁸ The method adopted for this work is more or less similar to that adopted for the *Quan fang bei zu*, but the contents of the two works are very different. This author records the comments made by earlier authors on the various plants whose names he repeats, but he also clearly records his own impressions and remarks,

⁷³ See Atran (1986; 1990).

⁷⁴ We should also bear in mind his remarks relating to the choices of his predecessors (see below, the case of the *tong*, pp. 245–52).

⁷⁵ He completed the compilation of the *Ben cao gang mu* in 1578.

⁷⁶ We should, however, note that in the last *juan*, most of the ornamental plants that are cited did not figure in the *Ben cao tu jing*; there, the few references mentioned are poetic works, the sources of the literary names of plants indicated as synonymous with the principal names that appear in the entries. We are told, for instance, that the *mo li* 茉莉, jasmine, is called by Su Dongpo 蘇東坡 (1037–1101) *an she* 暗麝, ‘deep musc’, whereas Li Zhichun 李之純, one of the Song literati – he held administrative functions under the reigns of the emperors Shen Zong and Zhi Zong (1068–1100) – the author most cited in this chapter, under his Buddhist pseudonym Zeng Duanbo 曾端伯, calls it *ya you* 雅友, ‘elegant companion’.

⁷⁷ The date of the author’s postscript is 1621 and Bretschneider (1881, p. 70) mentions its publication in 1630, whereas Hummel (1944, p. 821) indicates an earlier edition in the Tian Qj period (between 1621 and 1628) and a second one around 1630.

⁷⁸ Some bibliographies ascribe thirty *juan* to it, but even if they are divided differently, according to Wang Yuhu (1979, p. 180), the contents of the various editions are identical.

the fruits of his own experience; and this lends additional interest to this collection, which circulated widely and was appreciated as much for the accuracy of the concrete information that he introduced into horticultural practice as for the work's literary qualities. As this author saw it, it was first and foremost a horticultural work but also a guide to useful wild plants.⁷⁹ The first seven *juan* are devoted to general observations about the weather, the calendar, the stars and meteorology (the weather forecasts that he makes on some days) and a horticultural calendar for each season.

The eighth volume, *gu pu* 穀部, deals with grains that constitute staple foods. Twenty-six plants are cited, eight of them vegetables. The following two *juan* mention sixty-four vegetables, classified under three rubrics: *xin xun* 辛薰, spicy-aromatic; *rou hua* 柔滑, tender-mucilaginous; and *qing liang* 清涼, refreshing. Four *juan* are then devoted to fruits, which are subdivided into four groups: *fu guo* 膚, fruit with skin; *ke guo* 殼果, fruits with shells; *luo guo* 蓏果, fruit from grasses or gourd fruits; and *ze guo* 澤果, fruit from humid places; in all, seventy-seven plants are cited. Tea and bamboos, represented by eight plants, form the subject of two further *juan*. The next *juan* is devoted to six textile plants.⁸⁰ Medicinal plants form the theme of the following three chapters, which cite sixty-nine of them. Then comes information about thirty-nine trees. Flowers, of which eighty-three are cited, are the subject of four *juan* and are presented in three categories: *mu ben* 木本, of ligneous stock; *teng ben* 藤本, of climbing stock; and *cao ben* 草本, of herbaceous stock. Fifty-seven grasses, *hui*, occupy the penultimate two chapters, and the last chapter is devoted to the crane, *he* 鶴, and the goldfish, *jīn yú* 金魚.⁸¹

A total of some 433 plants are given at least one name each; also provided are a description, essential therapeutic information,⁸² cultivation techniques, uses as food, medicinal recipes and extracts from prose literary texts and also poems.⁸³ Moreover, each new section begins with texts of synthesis. For example, before approaching each fruit separately, twenty or so paragraphs describe techniques for the cultivation and protection of the plants and for harvesting, preserving and preparing fruits.

⁷⁹ However, its form and the place that it holds in history lead me to include it here among the treatises of traditional botany, but also mention it later as a work of horticulture. In this connection, it is interesting to note that a recent edition with a commentary, 'taking the quintessence of it and rejecting the lees' (*qu qi jing hua, qu qi cao pai* 取其精華去其糟粕) (Wang Xiangjin 1985b, p. 5), presents it strictly as a treatise on horticulture. The text has even been brought up to date by the addition of entries concerning plants introduced into China since the date of the publication of the original book, such as the pineapple, or plants more recently cultivated, such as actinidia. Of course the modern editor has eliminated all the parts concerning meteorology and various other popular beliefs, 'the lees', which are no doubt considered to be tainted by superstitions. Since the publication of this book, another new edition of the complete text, this time a facsimile, has appeared. See Fan Chuyu et al. (1994, Volume 3, pp. 3–825).

⁸⁰ 'Textiles' on account of their fibres or their ultimate use, such as the mulberry tree, *sang* 桑, the leaves of which serve to feed silkworms. The title of this part of the work, in Chinese, is *Sang-ma-ge-mian* 桑麻葛棉, 'mulberry tree-hemp-pueraria-cotton'.

⁸¹ Treatises on gardens often devote chapters to the animals, which are by no means the least of their delights; see Métaillé (1988a). For a history of the goldfish in China, see Billardon de Sauvigny (1780), Zhang Zhongge (1986), Hervey and Billardon de Sauvigny (1950), Moule (1950). Several ancient Chinese treatises are republished in anon. (1993b). On a method of raising them, see Yu Yiqiang (1985).

⁸² We should not forget that all plants consumed by humans are classified firstly as medicinal, for edible plants belong to those that are not toxic even following prolonged use, cf Métaillé (1979).

⁸³ These citations are arranged under the titles *dian gu* 典故 and *li zao* 麗藻 respectively.

Except where citations are clearly indicated, the author appropriates the remarks of previous writers and, in this way, provides a kind of synthesis of early 17th-century botanical and horticultural knowledge. (We shall be returning to this subject below.)

Both the *Qun fang pu*'s success and also its limitations were certainly the reason for the 1708 publication, by order of Emperor Kangxi, of an extended second edition entitled *Guang qun fang pu* 廣群芳譜 (An Extended Treatise on Plants). It was produced by a nineteen-strong team working under the direction of Wang Hao 汪灝. The Introduction, *fan li*, at the beginning of the collection, explains the reasons for this second edition. The original text, despite its undeniable quality, was reckoned to be incomplete. Therefore, on the one hand, the information on existing entries was completed and a considerable number of new entries on plants judged to be interesting were introduced. On the other hand, passages considered irrelevant, such as that on the stars and also the part devoted to the crane and the goldfish, were suppressed. The form of the treatise was also modified. Now, in order to avoid the dispersion of information given under too many different rubrics, only three rubrics were retained for each entry: *hui kao* 彙考, *ji zao* 集藻 and *bie lu* 別錄. Under the first of these, citations provided information on the names, morphology and ecology of the plants, and sometimes anecdotes concerning the plants were added.⁸⁴ The second rubric covered collections of citations from literary and poetic authors, arranged in chronological order. The last rubric collected extracts from more technical works, relating to the uses, cultivation and so forth of the plants.⁸⁵

Having noted the absence of information on the subject of plants known by the time of this revision, the compilers now mentioned them and, in their Introduction, they explained that they had

collected together all foreign plants from beyond the frontiers and all the mountain plants that grow on the famous mountains of the country, which our predecessors had never seen. We have added these so that posterity may know about them.

Corrections were made in order to complete or rectify the citations and incorrect references to texts in the *Qun fang pu*; finally, every part reproduced from the initial text was preceded by the word *yuan* 原, 'original', while complementary words were indicated by *zeng* 增, 'addition'.

A concern for clarity led to a different distribution of the information relating to certain plants. A number of Rosaceae⁸⁶ and also the lotus appeared twice, once as 'flowers', *hua*, and again as 'fruits', *guo*.⁸⁷

⁸⁴ The sources for these extracts are the Classics, dynastic histories, biographies, local monographs, philosophical treatises and so on.

⁸⁵ Frequent references are made to treatises on agriculture, such as the *Qi min yao shu* and the *Nong zheng quan shu* (on these works, see SCC Volume 6, Part II). They also contain extracts from encyclopaedias such as the *Tai ping yu lan* and citations from various works on *materia medica*, *ben cao*.

⁸⁶ To designate these plants, the text says *mei xing tao li zhi lei* 梅杏桃李之類, 'categories of apricot/Japanese apricot and peach/Japanese plum'. Furthermore, it indicates that in the *Qun fang pu* these plants were placed in the category of flowers. But in fact they were presented in the chapter on 'fruits with skins'.

⁸⁷ As we have already seen, this procedure had already been adopted in the *Quan fang bei zu* (see p. 20 above).

Table 1 makes it possible rapidly to form an idea of the extent of the *Guang qun fang pu*'s additions to the *Qun fang pu* simply by considering the number of entries.⁸⁸ These were multiplied roughly by four; medicinal plants accounted for the most numerous additions and now made up over one-third of all the plants mentioned.

The content of each of the earlier entries was itself expanded by new citations, and even the original text was reworked in places, without any indication that this had been done, as can be seen from the case of ginger, *jiang* 薑 (the text reproduced from the *Qun fang pu* figures in capital letters, the parts added by the editors of the *Guang qun fang pu* are in lower case letters):⁸⁹

GINGER: the *Shuo wen* gives a graphic variant *jiang* 薑 VEGETABLE THAT FEARS HUMIDITY. YOUNG SEEDLING TWO OR THREE FEET HIGH. LEAVES resembling the leaves of *jian zhu* 箭竹⁹⁰ but longer in OPPOSITE pairs. YOUNG DARK GREEN SEEDLING. WHITE ROOT⁹¹ IF YOUNG AND TENDER, YELLOW IF OLD. NO FRUIT.⁹² THEY CAN BE FOUND MORE OR LESS EVERYWHERE. THE BEST COME FROM THE WEN, FROM THE HAN AND FROM CHI ZHOU 池州.⁹³ THEY ARE SOWN⁹⁴ IN THE THIRD MONTH AND IN THE FIFTH MONTH PRODUCE SHOOTS RESEMBLING YOUNG REEDS beginning to grow but the end of the leaf is broader. Furthermore the leaf is aromatic and has a spicy taste. BEFORE OR AFTER *QIU SHE* 秋社,⁹⁵ NEW SHOOTS suddenly begin to grow LIKE a series of FINGERS. THEY ARE GATHERED FOR EATING. THEY ARE CALLED GINGER WITH PURPLE SHOOTS⁹⁶ OR ELSE CHILD-GINGER.⁹⁷ THOSE FROM AFTER THE AUTUMN EQUINOX ARE OF SECONDARY QUALITY AND AFTER THE FROSTS, THEY ARE TOO OLD ...

The reworked part of the text does not refer explicitly to any source. In fact, though, without giving any precise indications, Wang Xiangjin had drawn heavily on Li Shizhen's *Ben cao gang mu* when writing the introductory passages in which plants are named and described and their dietary and medicinal properties are noted. To check these passages, the authors of the *Guang qun fang pu* had returned to their

⁸⁸ Actually, the number of botanical species that it refers to is slightly different because certain plants have been divided between different rubrics: e.g. flowers and fruits, but also because a particular term may, as we have just noted, designate what modern taxonomists recognise sometimes as a species, sometimes as a variety, or even as a genus. The figures given should therefore be verified by a detailed reading of the text. Bretschneider (1881, p. 70), for his part, writes, 'the number of species described in the *Guang qun fang pu* amounts to about 1700'.

⁸⁹ *Zingiber officinale* Roscoe; Jia Zuzhang and Jia Zushan (1955/1769). Placed in the category of vegetables, *juan* 13.

⁹⁰ *Phyllostachys bambusoides* Sieb. et Zucc.; Jia Zuzhang and Jia Zushan (1955/2080) and Geng Yili et al. (1965, p. 99).

⁹¹ This is really a rhizome that in modern Chinese is called *gen (zhuang) jing* 根(状)莖, literally 'stem (in the form of) a root'.

⁹² The text of the *Guang qun fang pu* is at this point shorter than the original, which adds 'without flower or fruit'.

⁹³ Today Guichi-xian 貴池 in Anhui.

⁹⁴ The ginger that neither flowers nor fruits in China is grown as a vegetable: strips of the rhizome are sown. See Wu Gengmin (1957, pp. 111–12). The region where the plant was domesticated remains uncertain: 'probably southeast Asia' (Smith 1976, p. 324), the subtropical forest zone of eastern Tibet (Li Fan 1984, p. 132), the zone in between the valleys of the Huang He (Yellow River) and the Yangzi River (Wu Delin 1985).

⁹⁵ The Autumn festival of the Soil God, generally the fifth day in *wu* 戊 after Li Qiu 立秋 (the Beginning of the Autumn', 7–9 August), according to the *Ci hai* dictionary.

⁹⁶ *Zi ya jiang* 紫芽薑. ⁹⁷ *Zi jiang* 子薑.

Table 1. Comparison of the number of names of plants quoted as entries in the *Qun fang pu* (1620) and the *Guang qun fang pu* (1708)

<i>Qun fang pu</i> 群芳譜			<i>Guang qun fang pu</i> 廣群芳譜		
Chapter title	Number of <i>juan</i>	Number of plant names cited as entries	Chapter title	Number of <i>juan</i>	Number of plant names cited as entries
<i>Gu pu</i> 穀譜	1	26	<i>Gu pu</i> 穀譜	4	45
Grains					
<i>Shu pu</i> 蔬譜	2	65	<i>Shu cai pu</i> 蔬菜譜	5	146
Vegetables					
<i>Guo pu</i> 果譜	4	79	<i>Guo pu</i> 果譜	14	174
Fruits					
<i>Cha pu</i> 茶	1/2	2	<i>Cha pu</i> 茶譜	4	4
Tea					
<i>Zhu pu</i> 竹	1/2	6	<i>Zhu pu</i> 竹譜	5	6
Bamboo					
<i>Sang-ma-ge-mian pu</i> 桑麻葛綿譜	1	6	<i>Sang-ma pu</i> 桑麻譜	2	10
Textiles plants					
<i>Yao pu</i> 藥譜	3	69	<i>Yao pu</i> 藥譜	8	497
Medicinal plants					
<i>Mu pu</i> 木譜	2	39	<i>Mu pu</i> 木譜	14	232
Trees					
<i>Hua pu</i> 花譜	4	83	<i>Hua pu</i> 花譜	32	233
Flowers					
<i>Hui pu</i> 卉譜	2	57	<i>Hui pu</i> 卉譜	6	205
Grasses					
Total	20	432			1550
					1121

sources and, no doubt in a spirit of fidelity, precision and exhaustiveness, reused the original text, completing it with information supplied by other authors. In the case of ginger, the text cited above is a synthesis of the knowledge recorded by Su Sung in the *Ben cao tu jing*⁹⁸ and other works culled from the *Ben cao gang mu*.⁹⁹

Now let us consider the most voluminous of this type of text that is formed of citations from works for the greatest part composed during the historical periods preceding the Qing dynasty: the *Gu jin tu shu ji cheng* 古今圖書集成 (Imperially Commissioned) Compendium of Literature and Illustrations, Ancient and Modern). On account of its considerable importance, this Imperial Encyclopaedia has already been cited several times. Its composition was undertaken by the scholar Chen Menglei 陳夢雷 and 'involved a story of private initiative, personal endurance and official sponsorship, tempered by imperial support, interference and anger',¹⁰⁰ and it was completed in 1726 under the direction of Jiang Tingxi 蔣廷錫, the first author having been exiled by order of Emperor Yongcheng 雍正.¹⁰¹ Since several descriptions of it exist,¹⁰² I shall be concentrating here on the part devoted to plants, which contains 320 of the 10,000 chapters of this monumental encyclopaedia. This collection is entitled *Cao mu dian* 草木典¹⁰³ (Citations from the Classical Texts Relating to Plants) and it forms part of the fourth sub-collection of the encyclopaedia *Bo wu hui bian* 博物彙編 – a title that Lionel Giles rendered as 'Science'.¹⁰⁴ This is made up of three other sections: *Yi shu* 藝術 (Arts, Occupations and Professions), *Shen yi* 神異 (Religion) and *Qin chong* 禽蟲 (The Animal Kingdom). It forms the twentieth part of the encyclopaedia's thirty-two thematic sections. Bretschneider mentions it briefly, recognising that

it has a good claim to be regarded as the most complete collection of Chinese records on botanical matter extant, and its having been printed with large movable copper types on excellent papers renders it especially useful for reference. A great number of rare and now lost ancient records and treatises on agriculture have been produced in it.¹⁰⁵

Sometimes one chapter corresponds to one rubric, sometimes one and the same rubric covers several chapters and sometimes a single chapter contains several rubrics. In each of those rubrics, the information is classified under six different titles and the order in which the citations appear is *grosso modo* chronological. *Hui kao* 彙考 (Investigation into the collections) generally starts off with a mention of several names that refer back to the title of the entry.¹⁰⁶ Then comes an illustration of the

⁹⁸ See SCC Volume 6, Part 1, p. 281.

⁹⁹ The *Shen nong ben cao jing* was already an important source for the citations found in the *Quan fang bei zu*. This new example confirms the weight of tradition exerted by the *ben cao* in the development of botanical knowledge in China. On this literature, see Volume 6, Part 1, Okanishi Tameto (1969; 1977), Unschuld (1986).

¹⁰⁰ Loewe (1987). ¹⁰¹ See Durand (1992a, p. 202).

¹⁰² To the references already indicated (Volume 6, Part 1, p. 206) – Franke (1945), Teng and Biggerstaff (1971), Hummel (1944), Giles (1911), Takizawa Toshizuke (1933) – should now be added Loewe (1987).

¹⁰³ There is now a separate edition of this collection, see Jiang Tingxi (1998). ¹⁰⁴ Giles (1911, p. ix).

¹⁰⁵ Bretschneider (1881, pp. 71–2).

¹⁰⁶ These names are often synonyms but they may also designate plants traditionally considered to be close varieties.

plant to which the rubric corresponds, followed by collations of extracts of historical works and techniques, some of which are recorded *in extenso*.¹⁰⁷ *Yi wen* 藝文 (Literature–art) groups together literary texts in prose or in verse, mostly recorded with no omissions, whereas under the heading *Xuan ju* 選句 (Selected pieces) we find only extracts (some of them very brief) from poetic texts that cite the name of the plant under consideration. The next title, *Ji shi* 紀事 (Recorded facts) covers historical and factual anecdotes relating to the plants named at the start of the rubric.¹⁰⁸ Some of this information is most extraordinary. The contents of the extracts from the texts arranged under the next title, *Za lu* 雜錄 (Varia), do not seem fundamentally very different from the earlier ones. These too are anecdotes, many of them very strange. As for the *Wai bian* 外編 (Appendices), these record facts or events for the most part extracted from monographs, brush-stroke jottings and texts of other kinds.

The first sixteen chapters in this section concern generalities: after two chapters entitled *Cao mu zong bu* 草木總部 that are about plants in general, the next two are devoted to grasses, *cao*, and the following four to trees, *mu*. In the next few chapters the theme is the various parts of a plant: the leaf (Chapter 9), the flower (Chapters 10–14) and the fruit (Chapters 15–16). Some chapters correspond to categories defined by usage, such as *yao* 藥, medicinal plants (Chapters 17–22); *he* 禾, ‘grains’ (Chapters 23–4); *shu* 蔬, vegetables (Chapters 21–2); or *xiang* 香, perfumes (Chapters 316–18); *xin* 薪, wood for heating (Chapter 319); and *tan* 炭, wood charcoal (Chapter 320). However, most of the work concerns the names of plants.¹⁰⁹ The summary refers to 509 rubrics that start off with the name of a grass and 210 that start off with the name of a tree. It may seem astonishing that an undertaking of this scope, having produced such a huge volume of references, in the end addresses no more than a very limited number of plants, for the names of fewer than 800 are cited as rubric headings. Indeed, the names of plants that do figure as titles for the most part have a generic meaning. Thus under a single title in some cases, numerous other specific names appear: four ‘onions’, *cong* 蔥; five ‘smartweeds’, *liao* 蓼; and eleven ‘artemisias’, *hao* 蒿, are cited under each of the preceding titles.¹¹⁰ Consequently, a more precise

¹⁰⁷ For example, the texts of most of the horticultural monographs previously mentioned (*SCC* Volume 6, Part 1, pp. 355 ff.) are reproduced fully.

¹⁰⁸ Many of the sources are local monographs, *di fang zhi* 地方志.

¹⁰⁹ Under the names of plants that head rubrics, a modern botanist will recognise that in some cases they refer to a botanical species *stricto sensu*, as in Chapter 278, with, for example, *pi pa* 枇杷, loquat, *Eriobotrya japonica* Lindl. (Jia Zuzhang and Jia Zushan 1955/1071); sometimes they refer to larger botanical or ethnobotanical groups such as gourds, *gua* 瓜 (Chapters 44–6); lianas, *teng* 藤 (Chapter 112); or bamboos, *zhu* 竹 (Chapters 186–96), or even to folk genera such as *mai* 麥 (Chapters 22–4), which include a number of plants with important edible grains, mostly graminaceous but also a member of the chenopodiaceae, which is also assimilated by popular French and English nomenclatures to a type of wheat, *blé noir* (‘black wheat’) in French or buckwheat in English. A detailed comparison between scholarly nomenclature in Latin and traditional nomenclature in Chinese has already been presented in the case of hemp, *ma* 麻 (see *SCC* Volume 6, Part 1, pp. 170–7).

¹¹⁰ The names of species are generally constructed on the basis of generic terms; this provides a system of nomenclature formally analogous to that of modern botany. On this see *SCC* Volume 6, Part 1, pp. 143 ff. This process of using binominal terms seems to be a characteristic phenomenon of folk nomenclatures (see Atran 1986, pp. 30 ff.). Indeed, Linnaeus seems simply to have taken over and systematised one of the universal folk classifications.

calculation, taking account of the content and not of just the rubric titles, makes it possible to reach 1,800 for the number of plants cited.

Respect for the written sources also leads compilers to use only existing illustrations. So when no drawing of a plant can be found in the texts consulted, no graphic representation is provided in the encyclopaedia and this absence is indicated by the expression *tu que* 圖缺 ('illustration missing'). The text never provides a synthetic description of a plant, but is always composed of a sequence of citations, each one of these preceded by the title of the work of reference. The general organisation of the work is reminiscent of the *Er ya*.¹¹¹ The names of grasses are the first to be cited, followed by the names of trees. After the last chapter devoted to grasses *stricto sensu*, the subject becomes banana trees and bamboos, which, on account of their nature that is 'neither hard nor supple, neither grasses nor that of trees',¹¹² seem to effect a transition between these two fundamental groups.

In this brief commentary I of course make no claim to have exhausted the field of all possible sources. Some of the works that are mentioned but that concern horticulture more specifically will be discussed in a later section. On the other hand, other texts of a popular encyclopaedic nature have been hardly mentioned at all. I was faced with the huge scale of the project of producing a panorama of over two thousand years of the history of a discipline that did not, as such, exist but had been chosen as a domain within the framework of the great project elaborated by Joseph Needham, which was founded on his 'ecumenical' concept of the sciences. Given the circumstances, I have concentrated on the 'scholarly' aspect of the subject although, on occasion, I have allowed myself to indicate the extent to which the knowledge of the literati had been fuelled by knowledge based on popular practices. On the other hand, given that the present volume follows on from Volume 6, Part 1, *Botany*, of *Science and Civilisation in China*, reference texts described in that volume, in particular the monographs devoted to particular plants, will not be discussed here, all over again, although I shall not rule out sometimes using certain aspects of their contents. In order to avoid fastidious repetitions, since some of the texts will be used several times for the presentation of various aspects of traditional botanical knowledge – the classification of plants, their description, illustrations of them and so on – I shall refer back to Volume 6, Part 1 only the first time that the name of a text occurs. Readers should simply refer to the index of the said volume.

(2) THE DEVELOPMENT OF THE VARIOUS CLASSIFICATIONS

Turning now to study the development of the classifications of plants throughout the history of China, it is important to remember that, in this undertaking, we have

¹¹¹ For a description of this early encyclopaedia, see in particular *SCC* Volume 6, Part 1, pp. 187 ff. and below, pp. 119–24.

¹¹² This view of the nature of bamboos is already noted in the first lines of the Treatise on Bamboos, *Zhu pu* 竹譜, by Dai Kaizhi 戴凱之 (c.420–85), for which a detailed analysis is provided in *SCC* Volume 6, Part 1, pp. 378–87.

at our disposal a variety of types of work, with the exception of floras and treatises on systematisation. These are not known to have existed before the early 20th century. Not until that point did taxonomy begin to play a determining role in the development of modern botany.¹¹³ Certain passages in the preceding volume¹¹⁴ have already given some idea of ways of arranging plants in accordance with ecological criteria. The analysis of the *Er ya* has revealed a different approach,¹¹⁵ and the study of pharmacopoeias has indicated yet another classificatory system. I now propose to make an in-depth study of the various forms of classification in so far as the wide range of different sources allows us to appreciate them.

(i) *From the archaic period to the Song dynasty*

The earliest representations of plants as decorative motifs that are to be found on objects dating from the end of the Neolithic seem to indicate that ‘for the archaic period, grasses and trees were not differentiated’.¹¹⁶ The inscriptions on shoulder blades and turtles shells, the *jia gu wen* 甲骨文, however, make it possible to postulate an early division of plants into *cao*, grasses, and *mu*, trees,¹¹⁷ or even into three categories: grasses, trees and *he*, ‘cereals’.¹¹⁸ An analysis¹¹⁹ of the text of the *Shan hai jing* (Itineraries¹²⁰ of the Mountains and Rivers), compiled before the start of the 1st century BC,¹²¹ confirms the clear distinction between four fundamental categories, two belonging to the ‘wild sphere’, grasses – which include bamboos – and trees, and two belonging to the domain of the ‘domesticated sphere’, grains (*bai gu* 百穀, *wu gu* 五穀) and fruits (*bai guo* 百果).¹²² Other classifications can certainly be added to this first one, bearing in mind the importance that the text ascribes to the localisation of plants, indicating what grows at the top and at the bottom of the mountain and on the slopes that are exposed to the sun or are shaded, and in many cases noting whether growth is or is not abundant.¹²³ Li Shizhen refers to another classification of plants that is based on usage. In the introductory paragraph of the grains section, *gu bu* 穀部 (*juan* 22), he mentions the feat that tradition attributes to Shen Nong, the Divine Farmer, the mythical second emperor of China, who thereby improved the lot of humanity: before him ‘men knew nothing of grains; they ate animals and drank their blood’.¹²⁴ So he tasted grasses and distinguished

¹¹³ See Haas (1988).

¹¹⁴ Oecology and phyto-geography in the *Guan zi* book, *SCC* Volume 6, Part 1, pp. 48–56.

¹¹⁵ See *SCC* Volume 6, Part 1, pp. 185 ff. ¹¹⁶ Gou Cuihua (1980, pp. 43–4).

¹¹⁷ See Gou Cuihua (1980, p. 44), Qiu Zeqi (1986b, p. 123). ¹¹⁸ Ding Yonghui (1993, p. 269).

¹¹⁹ Ding Yonghui (1993).

¹²⁰ ‘Itineraries’ rather than ‘Classic’ is chosen as the translation of *jing* 經, following the translations proposed by Strassberg (2002) (‘gateways’) and Dorofeeva-Lichtmann (2007) (‘itineraries’).

¹²¹ A variety of hypotheses have been suggested for the dating of this work. See Fracasso (1993, p. 360).

¹²² Ding Yonghui (1993, p. 276).

¹²³ It was on the strength of these same sources that Wu Deduo (1988) tried to evaluate the extent of plant cover in the Huang He valley toward the end of the Zhou period. See Métaillé (1990b).

¹²⁴ At this point it is worth noting a myth that is common to agricultural civilisations: human groups are presumed to have found nourishment as meat-eating animals before the appearance of agriculture. However,

them from the grains and taught the people the art of ploughing; then he tasted grasses again and separated out simples that would prevent illness.¹²⁵ In this way another functional classification appeared, one that addressed wild plants in general, distinguishing two groups useful to human beings, medicinal plants and basic edible ones. It is worth noting that the plants in the second group soon ceased to be wild, for Shen Nong taught how to cultivate them. Other written sources provide information about an initial explicit differentiation of plants.

The Zhou li (Compendium of the Rites of Chou)

In the chapter headed 'Di guan si tu', the functions of the 'Great Director of the Multitudes' are described.¹²⁶ Among other tasks, in order to establish land taxes, he distinguished the beings that lived on the five soils, which are defined as follows:¹²⁷

First kind: forest and mountain; this suits furry animals, plants with fruits that stain things black (*zao wu* 皂物),¹²⁸ hairy and stocky men.¹²⁹ Second kind: watercourses and pools; this suits animals with scales, plants with receptacles (*gao wu* 膏物),¹³⁰ black,¹³¹ glistening men. Third kind: hills and slopes: this suits animals with feathers, plants with stones (*he wu* 核物), round, large men. Fourth kind: low plains and rich soil: this suits animals with carapaces, plants with pods (*jia wu* 荚物),¹³² white, thin men. Fifth kind: plateaux and damp land: this suits short-haired animals, bushy plants (*cong wu* 叢物), sturdy short men.

ethnographical works of the second half of the 20th century on the last hunter-gatherers (see the founding texts of this trend in Richard B. Lee and Irvin Devore (1968)) have shown the richness of the knowledge of the plant and animal environment of these non-agricultural societies. Judicious use of the available resources even provided relative abundance in return for very little effort. By analogy, the living conditions of humans before agriculture have been compared to a kind of golden age, 'the stone age, an age of abundance' (Sahlins 1972). The fact is that, although the history of humanity may be compared to that of an appropriation of the plant world, the plants that were cultivated represent only a small proportion of those that were or still are used. Still by analogy, we may assume that the hunter-gatherers of prehistory used quite a few of the plant species of their environment for nourishment, medicinal, technical, ornamental and symbolic purposes, alongside products of hunting and fishing. Harlan (1992, pp. 29–60) produces some interesting hypotheses about the adoption of agriculture.

¹²⁵ Li Shizhen (1975–81, Volume 3, p. 1433).

¹²⁶ Following the interpretation of Biot (1851, Volume 1, p. 192). ¹²⁷ See Lin Yin (1985, p. 97).

¹²⁸ The commentaries are in agreement in associating with this term oak trees that produce a black dye. A well-known dyeing substance is certainly produced by oak apples, which can easily be mistaken for fruits, as they survive after the fruit has fallen. However, the cups of acorns have also been used (Duchesne 1836) and various commentaries in the *Ben cao yan yi*, the *Zheng lei ben cao* and the *Ben cao gang mu*, as well as the illustrations in the last two of those works, certainly seem to indicate that the term *zao dou* designates the fruit, not the oak apples. Moreover, the fact that in the commentaries of Gao Xiu's *Lü shi chun qiu*, *zao dou* is identified (anon. 1977b, p. 2591) with the fruit of the *Quercus acutissima* Carr. perhaps provides extra proof to support this hypothesis, which would be confirmed by the observations made in the course of the voyage of Lord Macartney's embassy to Jehol: 'The cup of the Acorn (*Quercus Bungeana*) serves them to dye black' (cited by Bretschneider 1898b, p. 158).

¹²⁹ Literally, 'square', *fang fang*.

¹³⁰ The commentary by Zheng Xuan (127–200) corrects the term into its homonym *gao* 鞬, meaning 'quiver, bow case', explaining 'the fruits of the lotus and the prickly water lily have a case (*gao tao* 鞬韜)'.
¹³¹ *He* = fruit stone.

¹³² In botany today, the term *jia* designates legumes or pods, the fruits of plants of the Leguminosae family (Fabaceae). The commentary by Sun Tairang (1848–1908), reproduced in Lin Yin (1985, p. 101), regards it instead as a confusion for another character that designates plants possessing barbs and spines. Biot (1851) translated it as 'species with stones'. I, along with Jiang Ying (1980) and Chen Jiarui (1978), think it wiser to retain the initial term. The commentary by Zheng Xuan (Xia Weiying 1979b, p. 96) glosses the term as follows: 'of the category of the pods of the *ji* 薺 and the *wang ji* 王棘'. The first term is a generic that designates crucifers (Brassicaceae) with siliques of the *Capsella*, *Thlaspi* and *Draba* genera (see Haudricourt and Métaillé 1994, pp. 388–91); the second is identified

This text is important for the present study and for more than one reason. It uses a general term to designate plants – *zhi wu* 植物¹³³ – which are ‘planted things’ as opposed to ‘animated or moving things’ – *dong wu* 動物¹³⁴ – animals and humans (*min* 民, people); furthermore, it for the first time divides plants into five categories: *zao wu*, ‘with fruits that stain things black’; *gao wu*, ‘with receptacles’; *he wu*, ‘with stones’; *jia wu*, ‘with pods’; *cong wu*, ‘bushy’.¹³⁵

This classification of plants refers to the use of fruits for technical purposes, to the form or nature of the fruit and to the bearing of the plant. Furthermore, plants are set in correspondence to animals and humans and all of these are determined by the type of soil upon which they find themselves. The way in which plants are considered in their respective environments has already been noted in the case of the analysis in the *Guan zi* book, where plants are set in zones determined on the one hand by altitude and on the other by the availability of water.¹³⁶ Similarly, in the chapter entitled ‘Yu Gong’ 禹貢 (Tribute of Yu) in the *Shu jing* 書經, there are frequent mentions of different types of soil on which are found types of produce peculiar to the various regions on which they depend.¹³⁷ The choice of five for the number of categories of natural objects is certainly not a matter of chance and is also to be found in the classification of *materia medica*. On this point, let us consider what can be learnt from the classic work on medicine, the *Huang di nei jing su wen*, the composition date of which is estimated to be approximately the 2nd century B.C.¹³⁸

The Huang di nei jing su wen

In the chapter entitled ‘Wu chang zheng da lun pian’ 五常政大論篇,¹³⁹ in response to a question asked by the Yellow Emperor about the causes of the different manifestations of nature that it is possible to observe, Qi Bo 岐伯 explains the theory of the Five Phases and, within this framework, mentions grains, *gu* 谷; fruits, *guo* 果; and seeds, *shi* 實.¹⁴⁰ On the basis of this passage, it is possible to establish the

with *Indigofera pseudotinctoria* Matsum, a leguminous plant. These plants may be associated in a folk classification by their fruits, which contain tiny seeds. The first are silicles, the second pods, hence the choice of ‘plants with pods’ as a translation of *jia wu* 莢物, in which ‘pod’ is taken in a general sense that may incorporate silicles.

¹³³ According to Xia Weiying (1979b, p. 94), this is the first time the term appears in a Chinese text.

¹³⁴ Again according to Xia Weiying (1979b, p. 94), this is also the first time this term appears in a Chinese text.

¹³⁵ A number of recent texts suggest quite similar identifications for the following five types of plant. *Zao wu*: of the oak and chestnut genera (Jiang Ying 1980a), of the Fagaceae (Xia Weiying 1979b; Gou Cuihua and Xu Gangsheng 1982), plants with fruits with cupulas such as oaks and chestnut trees (Qiu Zeqi 1986b); *gao wu*: of the lotus and prickly water lily (*euryalus*) genera (Jiang Ying 1980a; Qiu Zeqi 1986b; Xia Weiying 1979b), Nymphaeaceae (Gou Cuihua and Xu Gangsheng 1982); *he wu*: of the *Prunus* genus (Jiang Ying 1980a; Qiu Zeqi 1986b), with drupes (fruit stones) (Gou Cuihua and Xu Gangsheng 1982), of the Japanese apricot and plum tree category (Xia Weiying 1979b); *jia wu*: of the Leguminosae (Jiang Ying 1980a; Qiu Zeqi 1986b; Xia Weiying 1979b), Leguminosae and *Capsella* (Gou Cuihua and Xu Gangsheng 1982); *cong wu*: reeds growing in clumps (Jiang Ying 1980a), Phragmites (Gou Cuihua and Xu Gangsheng 1982), probably plants such as reeds and Imperata (Qiu Zeqi 1986b). Except for *jia wu*, a term translated as ‘species with fleshy fruits’, following Chinese commentaries and the Gonzalvez dictionary, Biot (1851, Volume 1, pp. 194–5) had already proposed similar solutions.

¹³⁶ SCC Volume 6, Part 1, pp. 48–56, following Xia Weiying (1958; 1981).

¹³⁷ See SCC Volume 6, Part 1, pp. 82 ff. ¹³⁸ See Lu and Needham (1980, pp. 88–90, 106–7 and 110).

¹³⁹ *Juan* 20, Chapter 70; see anon. (1978, pp. 419 ff.). ¹⁴⁰ See anon. (1978, pp. 421–6).

following correspondences respectively for grains, fruits and seeds: hemp seed (*ma* 麻), the plum (*li* 李) and the fruit-stone (*he* 核) correspond to Wood; wheat and barley (*mai* 麥), the apricot (*xing* 杏) and seeds with fibrous reticulated interiors (*luo* 絡) correspond to Fire; millet (*ji* 稷), the jujube (*zao* 棗) and fleshy seeds (*rou* 肉) correspond to Earth; rice (*dao* 稻), the peach (*tao* 桃) and seeds with a hard shell (*ke* 壳) correspond to Metal; beans (*dou* 豆), the chestnut (*li* 栗) and juicy seeds (*ru* 濡) correspond to Water (see Table 2 (1)). Another chapter, 'Zang qi fa shi lun pian' 藏氣法時論篇, mentions foods that are favourable to the functioning of the five solid viscera: this time grains and fruits are associated with vegetables, *cai* 菜, and meats:¹⁴¹ indica rice (*jing mi* 粳米) the jujube (*zao* 棗) and the mallow (*kui* 葵), 'all with a sugary taste', suit the liver (the Wood Phase); the 'small bean' (*xiao dou* 小豆),¹⁴² the plum (*li* 李) and the Chinese chive (*jiu* 韭),¹⁴³ 'all with an acid taste', suit the heart (the Fire Phase); wheat or barley (*mai*), the apricot (*xing*) and the Chinese shallot (*xie* 薤),¹⁴⁴ 'all with a bitter taste', suit the lungs (the Metal Phase); soya (*da dou* 大豆), the chestnut (*li* 栗) and the bean leaf (*huo* 藿), 'all with a salty taste', suit the spleen (the Earth Phase); and finally, millet (*huang shu* 黃黍), the peach (*tao*) and the Chinese onion¹⁴⁵ (*cong* 蔥),¹⁴⁶ all with a spicy taste, suit the kidney (the Water Phase) (see Table 2 (2)). In another chapter, 'Jin gui zhen yan lun pian' 金匱真言論篇³⁴, grains are again related to the five viscera: barley and wheat correspond to the liver (the Wood Phase), the *shu* millet corresponds to the heart (the Fire Phase), the *ji* millet corresponds to the spleen (the Earth Phase),¹⁴⁷ rice, *dao*, corresponds to the lungs (the Metal Phase) and soya (*dou*) corresponds to the kidneys (the Water Phase). On the basis of these passages it is tempting to establish a general table of correspondences in the *Huang di nei jing su wen* (see Table 2 (3)).

The many differences that appear between these three sets of relations may testify to the composite nature of the work and in any case show that these classifications based on the Five Phases could be subject to numerous variations. The use, for therapeutic purposes, of the interplay of relations expressed by the theory of the Five Phases – partially and very briefly described in the above example – reappears in pharmacological practice, as can be seen from the text of the first *ben cao* passed down by tradition.

¹⁴¹ *Juan* 7, Chapter 22; see anon. (1978, pp. 148–9).

¹⁴² This term certainly covers cultivars of adzuki beans (*Vigna angularis* Willd; Ohwi and Ohashi = *Phaseolus angularis* Wight; see *SCC* Volume 6, Part II, p. 515) and of mung beans, *li dou* (*Vigna radiata* (L.) R. Wilczek = *Azukia radiata* (L.) Ohwi, *Phaseolus aureus* Roxb., *Phaseolus radiatus* Lour.). We should, however, note that in the commentary to the *Huang di nei jing su wen*, *xiao dou* is considered as a synonym of *ma zi*, hemp seed, *Cannabis sativa* L. On the revision of the *Vigna* genus, see Maréchal, Mascherpa, Stainier (1978).

¹⁴³ *Allium tuberosum* Rottler ex Spreng. ¹⁴⁴ *Allium chinense* G. Don = *A. bakeri* Regel.

¹⁴⁵ *Allium fistulosum* L. ¹⁴⁶ *Juan* 1, Chapter 4; see anon. (1978a, pp. 26–7).

¹⁴⁷ As Chang Te-Tzu points out (1983, pp. 65–6), the two millets cultivated in ancient China were certainly *Setaria italica* (L.) Beauv., the foxtail millet, and *Panicum milliaceum* L. millet. However, the precise botanical identification of the Chinese terms still poses a problem 'because of the lack of any botanical description in the earliest writings'. This point will soon be illustrated; see p. 59–62 below. On millets, see Bray, *SCC* Volume 6, Part II, pp. 434–48.

Table 2. *Correspondences in three chapters of Huang di nei jing su wen:*

- (1) Chapter 70, 'Wu chang zheng da lun pian'
 (2) Chapter 22, 'Zang qi fa shi lun pian'
 (3) Chapter 4, 'Jin gui zhen yan lun pian'

	(1) <i>gu</i> 谷 grains	<i>guo</i> 果 fruits	<i>shi</i> 實 seeds	(2) <i>gu</i> 谷 grains	<i>guo</i> 果 fruits	<i>cai</i> 菜 vegetables	(3) <i>gu</i> 谷 grains
Wood 木	麻	李	核	粳米	棗	葵	麥
Liver	<i>ma</i>	<i>li</i>	<i>he</i>	<i>jing mi</i>	<i>zao</i>	<i>kui</i>	<i>mai</i>
Fire 火	麥	杏	絡	小豆	李	韭	黍
Heart	<i>mai</i>	<i>xing</i>	<i>luo</i>	<i>xiao dou</i>	<i>li</i>	<i>jiu</i>	<i>shu</i>
Earth 土	稷	棗	肉	大豆	栗	藿	稷
Spleen	<i>ji</i>	<i>zao</i>	<i>rou</i>	<i>da dou</i>	<i>li</i>	<i>huo</i>	<i>ji</i>
Metal 金	稻	桃	殼	麥	杏	薤	稻
Lung	<i>tao</i>	<i>tao</i>	<i>ke</i>	<i>mai</i>	<i>xing</i>	<i>xie</i>	<i>dao</i>
Water 水	豆	栗	濡	黃黍	桃	蔥	豆
Kidney	<i>dou</i>	<i>li</i>	<i>ru</i>	<i>huang shu</i>	<i>tao</i>	<i>cong</i>	<i>dou</i>

The Shen nong ben cao jing 神農本草經

This text, the ultimate reference for Chinese *materia medica*, which has been systematically reproduced in the form of citations in works on *materia medica*, the later *ben cao*, seems to have been composed in the 2nd or 1st century BC.¹⁴⁸ The particular feature of the *Shen nong ben cao jing* is that the 365 medical products mentioned are presented in three categories that pay no attention to their original nature (animal, plant or mineral) but are based exclusively on their pharmaco-dynamic properties, which are defined by three grades, *pin* 品. These three categories are distinguished in the Introduction to the book. The 'princely' (*jun* 君) drugs constitute the top level, *shang pin* 上品. They are reputed to preserve health, are non-toxic and may be taken for long periods without producing any secondary effects. The 'ministerial' (*chen* 臣) drugs, less inoffensive, are to be used only in the case of infections and in accordance with a dosage that is limited temporally. These constitute the middle degree, *zhong pin* 中品. The 'assistant' (*zuo zhi* 佐治) drugs that constitute the lowest level, *xia pin* 下品, are, for their part, extremely active and therefore very toxic and are only to be used in very grave cases and in accordance with very strict procedures. These are the three classes that form the structure of the whole of the *materia medica* of the *Shen nong ben cao jing*. It is worth noting the analogy between their properties and those attributed to the prince and his subaltern officers in the functioning of an ideal society. It should also be noted at this point that although the *ben cao* entries are medicinal products from plants, animals or minerals, the prescriptions are always complex and involve drugs of different grades, those of a 'prince', a 'minister' and various 'assistants' whose concerted actions are believed to facilitate the optimal

¹⁴⁸ See SCC Volume 6, Part 1, p. 244, and, for a detailed analysis of the text, pp. 235-48.

absorption of the medication. In the case of each drug cited, its taste, *wei* 味, and its nature, *xing* 性, within the framework of the theory of the Five Phases are indicated. Thus the level of toxicity on the one hand, on a scale of three grades, and on the other hand the taste and nature according to the Five Phases constitute the two axes of the classification system for the *materia medica* mentioned in the text. It is noticeable that this is a classification of *materia medica* rather than of natural objects. The lack of differentiation between animals, plants and minerals was to continue for several centuries in the *ben cao*, according to the judgement of Tao Hongjing 陶弘景 (456–536).

The Shen nong ben cao jing ji zhu 神農本草經集注

In his preface to the *Shen nong ben cao jing ji zhu* (Collected Commentaries on the *Shen nong ben cao jing*¹⁴⁹), completed at the end of the 5th century, Tao notes the great variations that he has encountered in the number of drugs listed and also the numerous confusions regarding which of the three grades they belong to and the accounts given of their medical properties. To the 365 drugs of the *Shen nong ben cao jing*, he added an equal number and arranged the resulting 730 entries according to the principle of the three grades or ranks. The originality of his approach lay in his 'division of them under rubrics in accordance with the categories of things'. This system of setting things in order is expressed in terms that come from agriculture: the categories of things, *wu lei* 物類, are distinguished just as one separates fields by limits, *qu zhen* 區畛. Preserving the three fundamental classes corresponding to the three ranks – high, middling and low – Tao Hongjing introduces the following distinctions: jades, *yu* 玉; stones, *shi* 石; grasses *cao* 草; trees, *mu* 木; insects, *chong* 蟲; animals, *shou* 獸; fruits, *guo* 果; vegetables, *cai* 菜; grains, *mi shi* 米食; and those that are named but not used, *you ming wu shi* 有名無實.¹⁵⁰ Plants, separated into two by the animal group, are thus divided into five major categories, each of which is subdivided according to the three ranks: grasses and trees on the one hand, fruits, grains and vegetables¹⁵¹ on the other, plus the undifferentiated group of things 'named but not used'. Through this reorganisation (see Table 3) at the end of the 5th century, *materia medica* was henceforth divided into minerals, animals and plants. The plants, for their part, were arranged into five categories.

The *Xin xiu ben cao* 新修本草 (Newly Revised Pharmacopoeia), composed at the instigation of Su Jing 蘇敬 and completed in 659,¹⁵² inaugurates the era of official pharmacopoeias in China.¹⁵³ Once again, in the first instance, it involved a revision of the *Shen nong ben cao jing*. Alongside minerals and animals, 590 entries concern

¹⁴⁹ See the translation of this text in *SCC* Volume 6, Part 1, pp. 245–6.

¹⁵⁰ Tao Hongjing (1955, p. 5). It should be kept in mind that the term *chong* means 'insect', but also other small animals, mainly invertebrates, but some vertebrates, like frogs and toads.

¹⁵¹ We should, however, note that not all these categories are on the same level, for the last three are in fact subgroups of the first two: fruits come from trees and grasses, seeds and vegetables come from grasses.

¹⁵² For the history of this pharmacopoeia completed in 659 and compiled by imperial decree, see *SCC* Volume 6, Part 1, pp. 265 ff.; Okanishi Tameto (1977, pp. 60 ff.), Unschuld (1986, pp. 44 ff.).

¹⁵³ See Wu Deduo (1981, p. 1).

Table 3. *Classification of the materia medica in the [Shen nong] Ben cao jing ji zhu* (? +492) (*Notes to the Classical Pharmacopoeia of the Heavenly Husbandman*) (神農)本草經集注 by Tao Hongjing 陶弘景

玉石 <i>yu shi</i> minerals	草 <i>cao</i> herbs	木 <i>mu</i> trees	蟲獸 <i>chong shou</i> animals	果 <i>guo</i> fruits	菜 <i>cai</i> vegetables	米食 <i>mi shi</i> grains
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plants. In this group, 447 entries are divided between five sections, *bu*, devoted, respectively, to grasses, *cao*; trees *mu*; fruits, *guo*; vegetables, *cai*; and grains, *mi*. The remainder appear under the heading *you ming wu yong* 有名無用 ('named but not used'), which covers four categories, respectively minerals, *yu shi lei* 玉石類; plants, *cao mu lei* 草木類; insects, *chong lei* 蟲類; and finally 'twenty species of plants (*cao mu*) and animals (*chong miao* 蟲鳥)' that Tong Hongjing did not know, but 'which are known to the doctors of today but not to ordinary people'. This section thus mentions the properties of 134 extra plants.¹⁵⁴

In the first five sections, we again find the division into three ranks, *pin*, whereas in the section of plants known but not used, no rank is given – a fact that confirms the functional aspect of this classification. In the group formed by the five sections, grasses represent over half of the plants cited (256). No doubt the size of this figure led the authors to divide the grasses into two sub-groups – *shang* 上 (first) and *xia* 下 (second) – within the three principal divisions corresponding to the three ranks. The authors of this work always clearly indicate their sources: for example, the information concerning 248 entries in the plants section is taken from the *Sheng nong ben cao jing*, the *Ming yi bie lu* 名醫別錄 provides the information on 119 others, and new information is introduced for eighty new plants.

Two levels of classification are clearly named: a basic level that covers 'specifics', *zhong*, and an upper level, *lei*, that incorporates them. Now let us pause to consider the category 'named but not used'. In the light of the remark concerning plants and animals unknown to Tao Hongjing, 'which are known to the doctors of today, but not to ordinary people', it seems to be not so much a general category for everything that cannot be classified elsewhere but rather a means of preserving information about potential extra *materia medica* that should, however, be used with caution. For every product cited, all its medicinal properties are specified, as are its nature and its taste, according to the system of the Five Phases. In many cases synonyms for the name given for the entry, and also the period for harvesting the plant products, are mentioned. However, the fact that morphological details are

¹⁵⁴ The original text indicates 132 'species', *zhong* (see *juan* 20 of the facsimile edition of a manuscript preserved in Japan and recently republished (Su Jing 1981; 1985)) cited in the sub-group of plants, but a more precise count led Shang Zhijun (1981, p. 9), the author of a revised edition, to the number of 134. To this number should be added nine plants that figure in the last sub-group of products unknown to Tao Hongjing.

seldom given and even then only briefly, prompts me to detect in this category a preoccupation more pharmacological than botanical.¹⁵⁵

The order in which the whole of the *materia medica* group is presented in the *Xin xiu ben cao* is the same as in Tao Hongjing's revised pharmacopoeia: the plants are still placed in two groups, on either side of the sections devoted to animals.

The Zheng lei ben cao 証類本草

Although Tang Shenwei 唐慎微 may well never have seen any copy of this text,¹⁵⁶ the same type of presentation of *materia medica* is nevertheless what we still find in the various editions of his famous *Zheng lei ben cao*,¹⁵⁷ which was completed in 1082. There was, however, one difference: for the plants, the order of presentation of grains, *migu* 米穀, and vegetables, *cai*, is reversed, with the vegetables appearing at the end, as happened in a modification introduced earlier, in 1057, by the authors of the *Jia you bu zhu shen nong ben cao* 嘉祐補注神農本草.¹⁵⁸ Seventeen of the thirty *juan* of the book concern plants. The longest, with 446 plants, is the category of wild grasses, *cao pu* (*juan* 6 to 11). They are divided into the three ranks, *san pin*, and each is then subdivided into two parts – *shang pin zhi shang* 上品之上 and *shang pin zhi xia* 上品之下 – each one corresponding to one chapter. The tree section, *mu bu* (*juan* 12 to 14), consists of 263 entries; that of fruits, *guo bu* (*juan* 23), fifty-three entries; that of grains, *mi gu bu* (*juan* 24 to 26), forty-eight entries; and that of vegetables, *cai bu* (*juan* 27–9), sixty-five entries. This collection of entries forms the main body of the plants presented in the actual text. The text indicates the origin of the information concerning the plants named in each of the chapters. For example, in the first group of top-rank grasses, *Cao bu shang pin zhi shang* 草部上品之上, gathered together in *juan* 6, twenty-eight are taken from the *Shen nong ben cao jing*, two from the *Ming yi bie lu*,¹⁵⁹ one from the *Tang ben cao* and forty-six from the *Ben cao shi yi* 本草拾遺 by Chen Zangqi 陳藏器,¹⁶⁰ composed around +756. Then, an appendix cites 135 plants 'named but not used' and seventy-five plants that certainly figure in the *Ben cao tu jing* 本草圖經 but are 'external to the present work' – *ben jing wai cao* 本經外草. However, the text of the *Ben cao tu jing*, accompanied by an illustration, is provided for each plant in this latter group.

The Zhu pu 竹譜

Before we examine another domain in which plants play a part, namely agriculture, one author stands out by virtue of his theories on the classification of plants

¹⁵⁵ Joseph Needham, on the contrary, saw in this category proof of the naturalist character of the *ben cao*. See *SCC* Volume 6, Part 1, pp. 266, 276.

¹⁵⁶ *SCC* Volume 6, Part 1, p. 267.

¹⁵⁷ For a description of this book and its variants, see *SCC* Volume 6, Part 1, pp. 282–3, Okanishi Tameto (1977, pp. 104–46); Unschuld (1986, pp. 76–82).

¹⁵⁸ Okanishi Tameto (1977, p. 107).

¹⁵⁹ See *SCC* Volume 6, Part 1, pp. 248–50.

¹⁶⁰ On this text, see *SCC* Volume 6, Part 1, p. 275; Okanishi Tameto (1977, pp. 76–8); Unschuld (1986, pp. 50–2).

considered from the point of view of bamboos: Dai Kaizhi 戴凱之¹⁶¹ (c.+420–+485). His *Zhu pu* (Treatise on Bamboos) opens with the following remark: ‘Among the plants (*zhi wu* 植物), there is something called bamboo, neither hard nor soft, neither grass nor tree’. The author then adds, ‘*zhu* 竹 (bamboo) is the general term (*zong ming* 總名) for a tribe (*zu* 族)’ and he concludes, ‘among the plants there are grasses, trees and bamboos, just as among the animals there are fish, birds and beasts’. In this way Dai Kaizhi replaces the *Er ya* model, with its two forms of life – grasses and trees – by another model – grasses, trees and bamboos. His view of these plants is particularly interesting for he resolves the problem of the place of bamboos in medicinal and encyclopaedic texts in which bamboos are classified sometimes with grasses but more often in the category of trees, even though his lead was not then followed in China itself. As we shall see, it was not until the early 18th century, in Japan, that his approach was appreciated and developed by Kaibara Ekiken. It is particularly interesting to note that Dai Kaizhi was well aware of the difficulty of classifying these plants, which modern botanists place in the graminaceous family (Poaceae) on account of their internal structure, thereby recognising them to be ‘a kind’ of grass even though some species grow to impressive heights. Dai Kaizhi did notice that among the bamboos some differed slightly (*xiao yi* 小異) from others in that most were hollow but some were solid; but the undeniable characteristic that they all shared, namely stems with joints (Fig. 5), was the mark of their ‘great similarity’, *da tong* 大同, which he chose as the determining feature that set them apart in a group of their own.

The Qi min yao shu 齊民要術

The *Qi min yao shu* 齊民要術, completed in 535 by Jia Sixie 賈思勰, provides remarkable evidence about agricultural production in northern China, ranging from working the soil to the transformation of products and including cultivation techniques.¹⁶² It is also an important document from our point of view, for it lays the bases for the classification of plants in agronomic works. The plants in question are, of course, either cultivated or domesticated and they are implicitly classified into five groups that are determined by the sections into which the work is divided: (1) subsistence plants (*juan* 2); (2) condiment vegetables and plants (*juan* 3); (3) fruit trees (*juan* 4); (4) plants of technological interest, for the most part trees, and also bamboos and plants producing dyes (*juan* 5); and (5) exotic plants (*juan* 10).¹⁶³ The tenth and last chapter comprises 149 rubrics that introduce the Five Grains, *wu gu* 五穀; the ‘fruits of trees and the fruits of grasses’, *guo lo* 果蓏; and the ‘edible grasses’,¹⁶⁴ *cai ru* 菜茹, that are not produced in China. In order to avoid a

¹⁶¹ See SCC Volume 6, Part 1, pp. 369–87. ¹⁶² See SCC Volume 6, Part 11, pp. 55–9, in particular.

¹⁶³ The text points out that these plants are not cultivated. In fact, though, it was only in northern China that they were not cultivated (Mou Qiyu 1982, p. 563).

¹⁶⁴ The *Shuo wen jie zi* notes for *cai*, ‘those of the grasses that can be eaten’, and for *ru*, ‘to feed horses’. However, the definition of *cai* is repeated for *ru* in the *Shi huo zhi* 食貨志 commentary on the *Han shu*, so we may consider the two terms to be synonymous at the time when Jia Sixie used them.

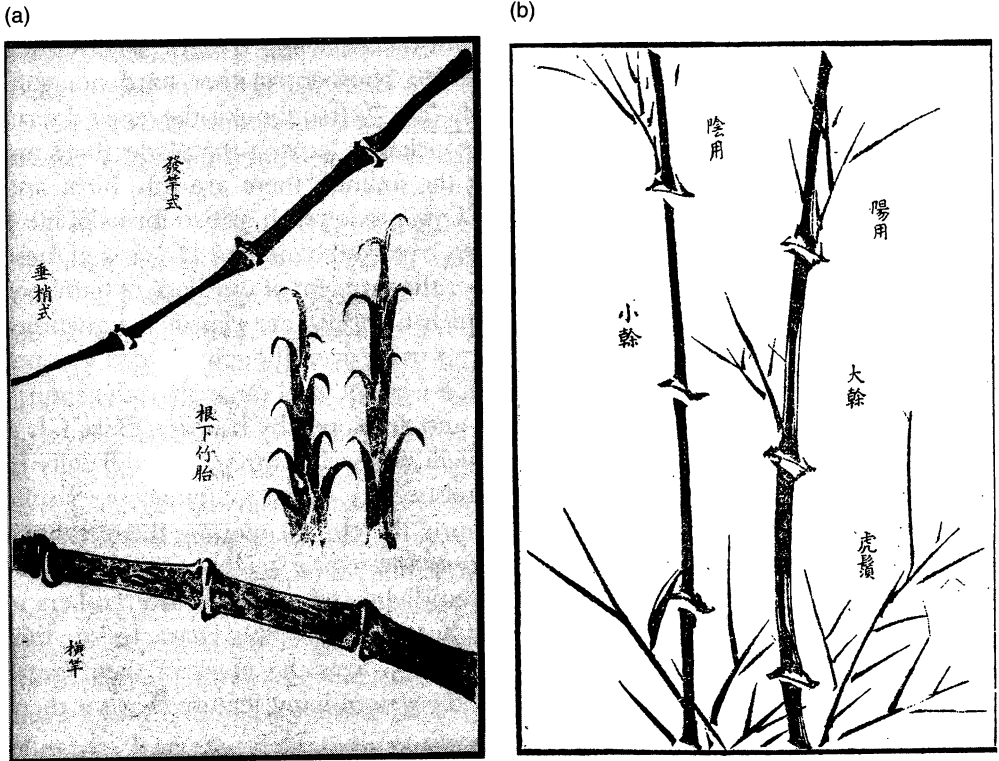


Fig. 5. Bamboo stems, from two treatises on painting: (a) *Jie zi yuan hua pu* 芥子園畫譜 (1679) by Li Yu 李漁 (modern edition, undated, Volume 2, p. 2a); and (b) *Qi yuan xiao yin* 淇園尚影 (1598) by Zhou Lüjing 周履靖. Note the importance of the joints on the stems. These examples show the relation between calligraphy and paintings of bamboo.

fastidious list of the names of plants cited in each of the above categories while still providing a precise idea of their content, I shall limit myself to a detailed list of the plants belonging to the two first groups, which, according to the rubric titles of Chapter 10, could have been designated 'Five Grains' and 'edible grasses'.

The first chapter is divided into the following thirteen rubrics:

- shu* 黍/*ji* 稷: glutinous/non-glutinous *Panicum* millet¹⁶⁵
liang 梁/*shu* 秫: non-glutinous/glutinous *Setaria* millet¹⁶⁶
da dou 大豆: soya bean¹⁶⁷
xiao dou 小豆: lesser bean¹⁶⁸
ma 麻: male hemp

¹⁶⁵ *Panicum miliaceum* L. Beauv., in SCC Volume 6, Part II, p. 440.

¹⁶⁶ *Setaria italica* L. Beauv., in SCC Volume 6, Part II, p. 440.

¹⁶⁷ *Glycine max* L. Merrill, in SCC Volume 6, Part II, p. 512.

¹⁶⁸ See note 142 above.

ma zi 麻子: female hemp¹⁶⁹
da/xiao mai 大/小麥: barley and wheat¹⁷⁰
shui dao 水稻: irrigated rice
han dao 旱稻: pluvial rice¹⁷¹
hu ma 胡麻: sesame¹⁷²
gua 瓜: cucurbits, and *qie zi* 茄子: aubergine
hu 瓠: lagenaria¹⁷³ gourds
yu 芋: taro¹⁷⁴

This simple list shows that alongside cereals, beans and a tuber, Cucurbitaceae and the aubergine are also cited as subsistence plants or staple foods. This suggests that the status of marrows and the aubergine was different from that which obtains today in China, where the fruits of these plants are regarded as garden vegetables¹⁷⁵ that provide complementary foodstuffs rather than staple foods.¹⁷⁶ If we now turn our attention to the third chapter of the *Qi min yao shu*, we find lists of garden vegetables, which, in the 6th century, ‘complemented’ the ‘Five Grains’. This group, arranged in thirteen rubrics, comprises

kui 葵: mallow¹⁷⁷
man jing 蔓菁: turnip,¹⁷⁸ *song* 松: *pakchoi*,¹⁷⁹ and *lu fu* 蘆菔: radish¹⁸⁰
suan 蒜: garlic, and *ze suan* 澤蒜: water garlic¹⁸¹
xie 薤: Chinese shallot¹⁸²
cong 蔥: Chinese onion¹⁸³
jiu 韭: Chinese chive¹⁸⁴
shu jie 蜀芥/*yun tai* 芸薹/*jie zi* 芥子: ‘mustards’¹⁸⁵
hu sui 胡荽: coriander¹⁸⁶
lan xiang 蘭香: basil¹⁸⁷

¹⁶⁹ *Cannabis sativa* L. The text draws a clear distinction between the male plants and the female ones. The former are reputed to be good for the production of fibres, the latter for that of seeds. On the sexual differences between plants, see pp. 296–320.

¹⁷⁰ On these two cereals, see *SCC* Volume 6, Part II, pp. 459–77.

¹⁷¹ On the history and the cultivation of rice in China, see *SCC* Volume 6, Part II, pp. 477–510.

¹⁷² *Sesamum indicum* L. in *SCC* Volume 6, Part II, p. 525. ¹⁷³ *Lagenaria siceraria* Molina, Standl. var.

¹⁷⁴ *Colocasia esculenta* Schott., in Li Hui-lin (1969).

¹⁷⁵ See the presentation of this notion in Anderson (1988) and *SCC* Volume 6, Part II, pp. 539–53.

¹⁷⁶ On this opposition between principal and complementary foodstuffs in China, see Chang Kuang Chih (1977a, pp. 23–51).

¹⁷⁷ *Malva verticillata* L., in Li Hui-lin (1969). ¹⁷⁸ *Brassica rapa* L.; see Li Hui-lin (1969).

¹⁷⁹ *Brassica chinensis* L. in Li Hui-lin (1969). ¹⁸⁰ *Raphanus sativus* L. in Li Hui-lin (1969).

¹⁸¹ Probably *Allium nipponicum* Franch. et Sav., in Li Hui-lin (1969).

¹⁸² *Allium bakeri* Regel, in Li Hui-lin (1969) = *A. chinense* G. Don.

¹⁸³ *Allium fistulosum* L. in Wu Gengmin (1957); Li Hui-lin (1969).

¹⁸⁴ In Wu Gengmin (1957), who indicates as its Latin binome *Allium odorum* L. Li Hui-lin (1969) calls it Chinese leek, *Allium ramosum* L. The modern identification must be *Allium tuberosum* Rottler.

¹⁸⁵ Li Hui-lin (1969) indicates the following identifications for these three plants: *Brassica alba* Rabenth., white mustard; *Brassica chinensis* var. *oleifera*; *Brassica cernua* Hemsl.

¹⁸⁶ *Coriandrum sativum* L. in Li Hui-lin (1969). ¹⁸⁷ *Ocimum basilicum* L. in Li Hui-lin (1969).

ren 荳蔻/liao 蓼: *Perilla*/water pepper¹⁸⁸

jiang 薑: ginger¹⁸⁹

rang he 蕺菜/qin 芹/ju 苣: *mioga* ginger¹⁹⁰/*oenanthe*¹⁹¹/lettuce,¹⁹² and jin 葶/hu xi 胡薹: violet/cockleburd¹⁹³

mu xu 苜蓿: alfalfa.¹⁹⁴

This group that associates leaf vegetables, such as mallows, and root vegetables, such as radishes, with a large quantity of aromatic plants and condiments suggests a cuisine that was already diversified and certainly very tasty.¹⁹⁵ When considering all the plants cited in the work, it is possible also to regroup all useful plants into two major categories: indigenous or naturalised cultivated plants (subdivided into grains, vegetables, fruits and trees) and foreign or wild plants, hardly cultivated or not cultivated at all in the north of China (subdivided into grains, fruits and vegetables). The implicit classification, in so far as this work suggests it, is even more complex, for in each of the rubrics enumerated above we find the names of a variety of cultivated forms. Although certain rubric titles do designate precise species such as *jiang*, ginger, or *hong lan hua* 紅藍花, *carthamus*,¹⁹⁶ most of the names refer to groups either of cultivars of the same species, such as jujubes, *zao*, or to species of different genera in the same botanical family, such as *gua*,¹⁹⁷ or else to groups of taxa that are botanically distant, such as textile plants, *ma*.¹⁹⁸ Sometimes, these titles are formed of two juxtaposed generic names, such as *ren* and *liao*, *xing* and *mei*. The resulting disyllable designates a group containing plants perceived as

¹⁸⁸ *Perilla frutescens* Britt. and *Polygonum hydropiper* L., in Li Hui-Lin (1969). Water pepper is still consumed as a leafy vegetable in South East Asia and is to be found for sale, fresh, in shops of Asiatic products in Paris today (2010). In Japan, the cotyledons are used to flavour dishes of raw fish (*sashimi*) (Hoshikawa and Chihara 1970). Mentions of the adult plant have a rather disagreeable connotation. The ‘nettles’ of the French and English translations of the title of the novel by Junichiro Tanizaki, *The Taste of Nettles*, are in fact *tade* – that is to say water pepper. See Métaillé (1999c, p. 284).

¹⁸⁹ *Zingiber officinale* Rosc., in Li Hui-lin (1969).

¹⁹⁰ *Zingiber mioga* Rosc., in Li Hui-Lin (1969). The young shoots and the rhizome of this ginger that is native to China and Japan are still widely eaten in Japan, in the form of pickles.

¹⁹¹ *Oenanthe stolonifera* DC., in Li Hui-Lin (1969).

¹⁹² Li Hui-Lin (1969) identifies the name with *Lactuca denticulata* Maxim. Mou Qiyu (1982, p. 160), on the basis of various glosses, concludes that *ju* can only designate one plant of the *Lactuca* or *Sonchus* genera.

¹⁹³ *jin* is identified by Li Hui-lin (1969) with *Viola verecunda* A. Gray, whereas Mou Qiyu (1982, p. 161) considers that *Viola yedoensis* Makino is also a possible choice. Both agree on the identification of *hu xi* with *Xanthium strumarium* L.

¹⁹⁴ *Medicago sativum* L., in Lio Hui-lin (1969). On the introduction of alfalfa into China, see Laufer (1919), pp. 208–19.

¹⁹⁵ See Anderson (1988, Chapter 4); Métaillé (1999a); Sabban (1993). For the Tang period, see Schafer (1977).

¹⁹⁶ *Carthamus tinctorius* L. (Gao Minggan 2006, p. 254). Cited in Chapter 52 as a dye-producing plant.

¹⁹⁷ We should note that the Cucurbitaceae are not all gathered under the generic *gua* since another generic term, *hu*, also exists. It seems to me that the existence of these two categories results from a difference in their uses. The *gua* are exclusively foodstuffs. If they are not consumed once they are ripe, they rot. The *hu*, in contrast, which can be consumed at the start of their development, when they are tender, if left to develop into complete maturity, form an envelope that hardens as it dries. They can at this point offer prime material for the fabrication of a variety of objects: gourds, ladles and seed containers and also musical instruments. In the latter form the *hu* constitute the first category in the classification of the ‘eight [sources of] sounds’ that are listed in the *Zhou li* (see SCC Volume 4, Part 1, p. 142).

¹⁹⁸ For a presentation of the various textile plants *ma* and a Latin nomenclature that may be based on the choices of their traditional Chinese nomenclature, see SCC Volume 6, Part 1, pp. 170–7.

sufficiently different to be distinguished in the nomenclature but sufficiently close to be associated with regard both to cultivation techniques and to uses. Thus the text of the *Qi min yao shu* indicates that cultivation techniques suited to apricot trees (*xing mei* 杏梅)¹⁹⁹ are identical to those for peach and plum trees (*tao li* 桃李), which form another analogous group.²⁰⁰ As for the names of varieties (or cultivars) within these groups, they are indicated not in the actual text of the treatise but by citations from earlier works. Thus, four levels of plant classification appear clearly from a reading of the *Qi min yao shu*: starting at the lowest level, we find cultivated variety (e.g. *zhu mei* 朱梅, 'mei vermillion' according to the *Xi jing za ji* 西京雜記), specific or generic level (e.g. *mei*, *xing*), plurigeneric group (e.g. *xing mei*) and usage category (*guo luo*, 'fruits'; *wu gu*, 'staple food'; *cai ru*, 'vegetables'). Implicitly, two other levels, at least, may be added: that which corresponds to herbaceous plants on the one hand (*cao*) and to ligneous plants (*mu*) on the other, and, finally, that which designates the whole of the *cao mu* group of plants. Tied in with this classification, there is the distinction between wild plants and cultivated plants, indigenous and foreign plants (see Table 4).

A comparison with the choices of Tao Hongjing for medicinal plants indicates a certain convergence in the classification of plants useful to human beings.²⁰¹ However, a reference to the Five Phases, which is important for medicinal plants, is absent for the plants of agricultural interest. Nevertheless, that is the system upon which a cosmogonic work, the *Wu xing da yi*, is founded (+600).²⁰²

The Wu xing da yi 五行大義

The author, Xiao Ji 蕭吉, takes into account earlier literature, in particular the *Shen nong ben cao jing* and the *Huang di nei jing su wen*, when he proposes a sort of theoretical synthesis of different kinds of knowledge. In the chapter 'Lun pei qi wei' 論配氣味 (Matching Smells and Tastes) we find a categorisation of subsistence crops, grains and fruits. After mentioning various types of correspondence between the Five Phases and the plants, the author writes as follows (see Table 5):

To sum up, of the 'Five Grains', the bearded ones (*mang*) correspond to Wood, the loose ones (*san* 散) correspond to Fire, the compartmented ones (*fang* 房) correspond to Metal, the pods (*jia* 莢) correspond to Water, the dense ones (*cui* 萃) correspond to Earth. The bearded

¹⁹⁹ *Xing*, the apricot tree, is commonly identified with *Prunus armeniaca* L., and *mei*, the Japanese apricot, is identified with *Prunus mume* Sieb. et Zucc. Some modern botanists have also found them to be sufficiently close to one another and different from other species of the *Prunus* genus to revert to an earlier state of classification and set them in the *Armeniaca* genus; hence *Armeniaca vulgaris* Lamark for the apricot tree and *Armeniaca mume* Sieb. for the Japanese apricot tree (Yu Dejun 1982, pp. 45 ff.), thereby reverting to the ancient association that marks out the term *xing mei*.

²⁰⁰ This category appears already in the *Er ya*, as we shall soon see.

²⁰¹ It seems that the earlier date of the work of Tao Hongjing leads one to attribute to him the credit that Shi Shenghan (1982, p. 5) gave to the *Qi min yao shu* when he wrote, 'this system of classification is the basic form adapted in all "natural histories", herbalist writings and *materia medica* of China. Since, however, of the extant books on this subject, none is authentically earlier than the *Qi min yao shu*, for the time being we have to credit Jia Sixie with the priority of using such a system, anyhow in written form'.

²⁰² I must thank Marc Kalinowski for having drawn my attention to this text, for which he has published a translation with a commentary. The chapter in question here is considered in Kalinowski (1991, pp. 273–83).

Table 4. Classification of useful plants, wild and cultivated, deduced from the text of the Qi min yao shu

Wu gu 五穀 staple foods		Cai ru 菜茹 vegetables		Guo luo 果祿 fruit trees		Plants with technical purposes
Northern China	Southern regions	Northern China	Southern regions	Northern China	Southern regions	
Wheat and barley, mai 麥	Sorghum, shu shu 蜀黍 Carex, shi 藎	Mallow, kui 葵	Ipomea, weng 雍	Pear, li 梨	Coconut, ye 椰	Northern China Mulberry, sang 桑, elm, yu 榆, bamboo, zhu 竹, carthame hong lan hua 紅藍花 ...
Soya, da dou 大 豆 ...		Chinese onion, cong 蔥 ...	Seaweeds Chondrus, lu jiao 鹿 角	Kaki Shu 柿 ...	Lichi, li zhi 荔枝 枝 ...	

Table 5. *Types of grain and fruit linked with the Five Agents in the chapter 'Lun pei qi wei' of Wu xing da yi 五行大義 (+600), by Xiao Ji 蕭吉*

Agents	Types	Grains	Types	Fruits
Wood	<i>mang</i> 芒: 'bearded'/ thin	barley, wheat	<i>zi</i> 子: with pips	pear, apple
Fire	<i>san</i> 散: 'loose'	sticky millets	<i>he</i> 核: with kernel	peach, plum
Earth	<i>cui</i> 萃: 'dense'	sorghum, foxtail millet	<i>fang</i> 房: with compartments	grape
Metal	<i>fang</i> 房: 'compartmented'	sesame	<i>pi</i> 皮: with rind	citrus fruits
Water	<i>jia</i> 莢: 'pod'	soya, mungo	<i>ke</i> 殼: with shell	walnut, chestnut

ones belong to the genus of barley and wheat, the loose ones belong to the genus of *Panicum* millet, the compartmented ones belong to the genus of sesame,²⁰³ the pods belong to the genus of soya and beans, the dense ones belong to the genus of sorghum and *Setaria* millets.

The author then justifies this interpretation by correlations that he finds between the appearance of plants and the characteristics of the phase to which they correspond:

Those with beards grow slender and upright like a tree emerging from the earth; they resemble pikes. The loose ones deploy themselves as though affected by the gentle warmth of fire. The compartmented ones have regular bodies as if fashioned by a metal blade. The pods are narrow as if stretched and shrunk in a current of water. The dense ones are a multitude. They are like the ten thousand things grouped on the earth ready to be used.

On the subject of fruits, Xiao Ji writes as follows:

For the 'five fruits', those with pips (*zi* 子) correspond to Wood, those with stones (*he* 核) to Fire, those with rind (*pi* 皮) correspond to Metal, those with shells (*ke* 殼) correspond to Water, the compartmented ones (*fang* 房) correspond to the Earth. [Fruits] with pips are of the genus of the pear and the apple, those with stones are of the genus of the peach and the plum, those with rind are of the genus of the orange and the tangerine, those with shells are of the genus of walnuts and chestnuts, the compartmented ones are of the genus of the grape. The smoothness of pips calls to mind the shiny look of trees when they begin to grow, fruits with pips come in abundance. A stone is to be found inside the flesh and cannot be eaten; it is like fire, the *yin* is within and can contain nothing. Rind is thick but wizens as though shrinking under the harmful impact of metal, beings that have arrived from western regions. With shells, the flesh is inside, you can eat it, it is like water, the *yang* is within and has the capacity to contain things. The compartmented develop in groups like all the beings grouped on the Earth.²⁰⁴

²⁰³ Banana clusters provide another example of such fruits.

²⁰⁴ English version of the author's French translation. Wang Yunwu (1939, pp. 50–1).

Alongside the somewhat forced aspect of the justifications of correspondences, one nevertheless notices a certain coherence in the choice of the distinctive characteristics that are mentioned, all of which concern the type of fruiting of both ‘grains’ and ‘fruits’. Furthermore, the categories that are defined in this way are related to pairs of well-known plants and form groups that are easily identifiable, with which it seems quite easy to associate other edible foods. What we have here is an attempt to define popular categories that are designated by association with two terms that the text of the *Qi min yao shu* has revealed and the existence of which is already attested in texts of antiquity, as an examination of the *Er ya* will show – terms that have continued to be used right down to the present day.

This leads us to texts of an encyclopaedic or lexicographical nature such as, respectively, the *Er ya* 爾雅 and the *Shuo wen jie zi* 說文解字, in which plants are presented primarily as words, tools of knowledge, rather than as objects used for particular practices.

The Er ya text

The composition of the *Er ya* (Literary Expositor) may be traced to sometime between the 4 and the 2nd century BC.²⁰⁵ The text, often obscure, of this encyclopaedia has inspired numerous commentaries throughout Chinese history. The most ancient that still exists is credited to Guo Pu 郭璞 (276–324) and was composed in +310. Its explanations provide precious aid for an analysis of the *Er ya*, for we know that some passages in it were already incomprehensible for its very first commentator. The original text is essentially a glossary which opens with a set of archaic names, most of which are followed by a synonymous term or a brief definition. This collection of terms is arranged in nineteen chapters, two of which are devoted to plants: ‘Shi cao 釋草’ (Explaining Grasses) and ‘Shi mu 釋木’ (Explaining Trees).²⁰⁶ A clear distinction is thus drawn between grasses and trees and the difference between them is made even more precise by the mention, at the end of the chapter on grasses, of different terms for the flowers of trees, *hua* 華, and the flowers of grasses, *rong* 榮. The great majority of the entries are names of plants²⁰⁷ – generic, specific or even names designating larger categories such as *hui* for grasses as a whole.²⁰⁸ Apart from this division

²⁰⁵ Quoting Karlgren (1931), Coblin (1993, p. 96) writes, ‘the *Er ya* is a work of different hands and probably dates from the third century B.C.’. On this, the first encyclopaedia, see *SCC* Volume 6, Part 1, in particular pp. 126 ff.

²⁰⁶ Four others are on animals. These few chapters, which provide an ancient source for the very beginnings of Chinese knowledge of natural history, have already become the subject of research in particular into the classification of animals and plants in ancient China. On the plants, see Xia Weiying (1962); on the animals, see Zou Shuwen (1958) and Zou Shuwen and Zhang Mengwen (1982).

²⁰⁷ About 200 names of grasses and 100 or so of trees are cited. Qiu Zeqi (1986b) suggests 220 and ninety-three respectively.

²⁰⁸ For *hui*, the commentary indicates *bai cao zong ming* 百草總名, ‘the general term for all the grasses’, literally ‘the one hundred grasses’.

into two chapters, there is no formal presentation of sub-groups. However, at the end of these two chapters devoted to plants, several names are cited, which seem to indicate a number of pertinent criteria for the *Er ya*'s authors in their study of plants. For grasses, it is stated that 'that which does not flower but fructifies is called *xiu* 秀, that which flowers but does not fructify is called *ying* 英'. Here are the differentiations that are named for trees, as explained by the main text and the interpretations of Guo Pu:

guan mu 灌木, 'trees in groups'

hui mu 癭木, 'a tree which, after a disease, manifests deformities and excrescences, with no branches'

fen 蕢, 'a tree that produces masses of fruit' (see Fig. 6a)

bao qiu mu 抱遘木, 'trees growing in groups with branches and roots that, at the knots, form excrescences'

shen 桫, 'a tree that has deteriorated naturally'

zi 槠, 'a standing dead tree'

yi 翳, 'a deteriorated tree, lying on the ground'²⁰⁹

yi 檯, 'trees worn away by rubbing against one another'

xi 楷, 'a tree with rough bark'

shao 梢, 'a dead tree, branchless and tall'

jiu 杓, 'a tree that is bent over'

qiao 喬 (1) 'with bent branches like feathers'

(2) 'with branches curving upward'

(3) 'resembling the catalpa'

(4) 'with interlacing twigs toward the top'

bao 苞, '(growing in clumps) like bamboos'

mao 茂 (1) '(with dense branches) like the pine and cypress'

(2) '(with dense branches) like the *Sophora*'

yi 檯, 'branchless'

guan 灌, 'trees growing together'

This list – no doubt somewhat disconcerting for today's botanists – returns us to an original view of plant life that takes account of criteria such as the bearing of branches but also the presence of burrs on the trunk or the aspect of a dead tree. Were these trees, with their different shapes, regarded as landmarks, indicating a path to be followed? The illustrations in a late edition of the *Er ya* (see Fig. 6b) could suggest so. It is worth noting that, in this list, *guan mu* and *qiao* – in the form of *qiao mu* 喬木 – have been taken over by modern botanists in order to translate the notions of 'shrub'/'bush' (*frutex*) and 'tree' (*arbor*)

²⁰⁹ The two terms *zi* and *yi* appear in a poem in the *Shi jing*. See Xiang Xi (1986, p. 572).

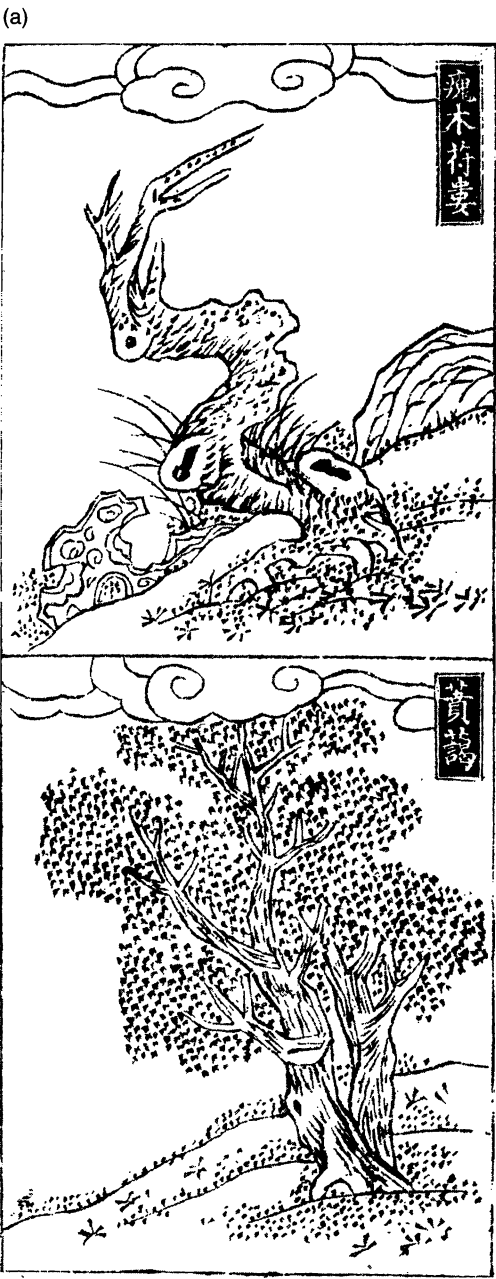


Fig. 6 (a). (Top) *Hui mu* 槐木: 'Tree, after disease, presents deformities and excrescences, with no branches'. *Fen* 黄: 'Tree producing an enormous amount of fruit'. From *Er ya tu* (1883, *shi mu*, 37a). The illustrations are supposed to be from the Song dynasty, but actually date from a later 1883 edition.

(b)

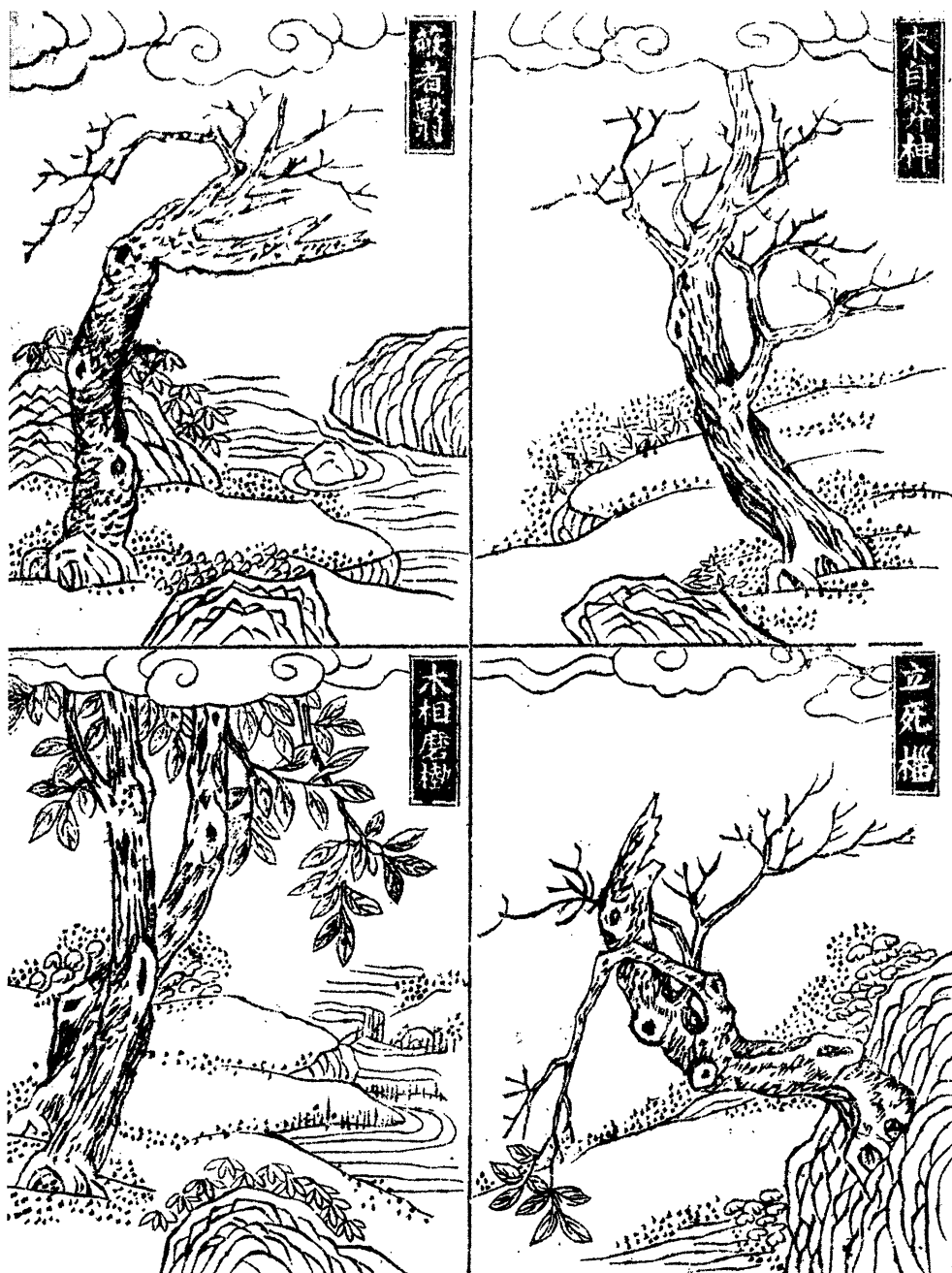


Fig. 6 (b). From top to bottom and right to left: *shen* 神, 'tree damaged by natural causes'; *zi* 榴, 'dead tree standing'; *yi* 斃, 'dead tree prone' (here the artist does not appear to have taken into account Guo Pu's commentary alluding to the tree lying on the ground); *yi* 樹, 'Trees worn by mutual abrasion'. From *Er ya tu* (1883, *shi mu*, 38b). The illustrations are supposed to be from the Song dynasty, but actually date from a later 1883 edition.

respectively.²¹⁰ Now let us consider the names of the plants cited and the original explanations that accompany them; the commentaries of Guo Pu will be taken into consideration afterwards. Simply with the help of the vocabulary,²¹¹ it is possible to distinguish a number of different groups. Among the ‘grasses’ very few plants are categorised in this way: a group of thistles, *jī* 薊;²¹² a group of small crucifers, *jī* 薺;²¹³ and a group of mallows, *kui* 葵.²¹⁴ In another case, the text of the *Er ya* itself indicates that the term *tiao* 苳 corresponds to two different names, *biao* 藁 and *pei* 芡,²¹⁶ depending on whether these plants bear flowers that are, respectively, yellow or white.²¹⁷ Elsewhere, several subgroups are also recognised among trees; the most important is that of the *zao* 棗 (jujube tree), which contains eleven kinds, among which it is possible to recognise forms of cultivars that are still known today.²¹⁸ The *tao* 桃 (peach tree), the *li* 李 (plum tree), the *liu* 柳 (willow) and the *sang* 桑 (mulberry tree) have three

²¹⁰ These are also the only terms that seem to have been picked out by historians of botany. Thus Jiang Ying (1980a, pp. 48–9) writes as follows: ‘This book divides plants into three categories: the category of grasses that are herbaceous plants; the category of trees is subdivided into: *qiao* if the branches intermingle at the top (those that possess a main trunk, the top of which carries branches), *yi* if there are no branches (those that possess a main trunk but without branches at the top, such as some of the *Palmae* family), *guan* that grow in clumps (growing as a bush with no main trunk). *Qiao mu* and *guan mu* are two technical terms that are still used today, but *yi mu*, to describe the main or columnar trunk of the *Palmae*, is a technical term that has so far not been used in botanical morphology’ (English translation from the author’s French translation). I myself prefer to think that the book refers to trees of a large number of types, two of which can be likened to the ethnobotanical categories of ‘tree’ and ‘bush’ that are nowadays used by botanists. We shall later be seeing how it was that these two terms made their way into the vocabulary of modern botanists. See p. 81.

²¹¹ For the purposes of this analysis, every time that the same morpheme designating a plant appears in the same position in several names of plurisyllabic plants, I consider it to be generic.

²¹² Bretschneider (1893, nos 7, 8, 159, 208).

²¹³ Bretschneider (1893, nos 18, 103). I am happy to use ‘small crucifers’ to translate the term *jī*, which nowadays designates shepherd’s purse, *Capsella bursa-pastoris* (L.) Medic., but which used to possess a generic meaning that is still attested in the *Ben cao gang mu*. See Haudricourt and Métailié (1994, pp. 386–91), Aodeliguer and Mei Taili (1996, pp. 226–8).

²¹⁴ Bretschneider (1893, nos 115, 116, 136, 148).

²¹⁵ Bretschneider (1893, nos 164, 165). Bretschneider suggests *Tecoma grandiflora* (= *Bignonia grandiflora* Lam. Jia Zuzhang and Jia Zushan 1955/0258) as a possible identification for this term, but, as he points out, this raises the problem that the flower is yellow, not white.

²¹⁶ Bretschneider (1893, no 165).

²¹⁷ Guo Pu’s commentary is most explicit: ‘*tiao*: the name varies depending on the colour of the flower’. Literally, ‘the colour of the flower is different, the names are not the same’.

²¹⁸ Today the indigenous jujube trees of China, the fruits of which are used, come from the wild species, the ‘acid jujube tree’, *suan zao* 酸棗 (*Zizyphus jujuba* Mill.), mostly used for medicinal purposes, and from various cultivars of the inermis variety of the former, *Zizyphus jujuba* Mill., var. *inermis* (Bunge) Rehd. (see Kong Xu 1987, pp. 580–7). Three of the names cited in the *Er ya* seem to designate various forms of acid or bitter fruits: *er* 棘, *jue xie* 厥洩 and *xuan wei* 還味. Two others, *zao* 棗 and *bian* 邊, are forms of the variety ‘shaped like a gourd’, *hu zao* 壺棗. *Ji* 檟 is a variety with white jujubes; *zun* 遵 a variety with small purplish globular fruits called, in the days of Guo Pu, ‘goat droppings jujubes’, *yangshi zao* 羊矢棗 (however, this was probably not a jujube tree but a persimmon, *Diospyros lotus* L.); *xian* 洗 ‘with large fruits like hens’ eggs’; finally *xi* 皙 designates a variety without stones. Guo Pu is unable to provide any commentary on the names for two other varieties. The gourd-shaped, stoneless varieties are still nowadays found among the cultivars of northern China (Kong Xu 1987, pp. 583–4). Similarly, among the nine varieties cultivated in the Cangzhou region in 1914, a naturalist missionary noted a variety ‘with stoneless fruit’ (Licent 1924, Volume 1, p. 15). It is remarkable that, of the nine varieties noted by this author, eight possess fruits with sweet flesh, the other one being very acid. These two pieces of evidence separated by some two thousand years show the continuing maintenance of certain cultivated forms (gourd-shaped and without seeds) with a preference for sweet-tasting fruit, while three of the eleven ancient varieties had a bitter or acid taste.

kinds, and the *lei* 梲 (brambles) have two. The criteria of differentiation as revealed by the nomenclature are the form, the relative dimension or the taste of the fruits, the absence of stones in the fruits and also the size of the tree. Another way of indicating that certain plants belong to the same group is the use of a technical term, *chou* 醜, meaning 'comparable' or 'similar', which indicates membership within the same classificatory category.²¹⁹ Even though only a few occurrences of its use are to be found in the whole text, this is nevertheless important, for it testifies to the beginning of systematisation in the analysis of the arrangement of natural objects and at the same time justifies the existence of popular categories, which are designated by two generic terms, as has already been noted above. The end of the chapter on trees thus reads as follows:

[the trees of the category of] *Sophora*-juzube trees are similar by virtue of their upright branches (*qiao*) (*huai ji chou qiao* 槐棘醜喬).

[Those of the category of] mulberry trees-willows are similar by virtue of their drooping branches (*tiao* 條) (*sang liu chou tiao* 桑柳醜條).

[Those of the category of] prickly ash trees (*sha*²²⁰) are similar by virtue of the fruit in clusters (*qiu*) (*jiao sha chou qiu* 椒櫟醜菜).

[Those of the category of] peach and plum trees are similar by virtue of the stones (*he*) (*tao li chou he* 桃李醜核).²²¹

The chapter on grasses also notes that 'reeds (*wei*) are similar by virtue of their tassels (*tiao*)', *wei chou tiao* 葦醜芳.²²²

The presence of generic terms²²³ and the use of a technical term, *chou*, are the two means clearly indicated in the text to announce regroupings of plants. Is it possible to detect other categories? We know that in Western works one way of presenting natural objects in pharmacopoeias was for a long time alphabetical order, in the absence of any other method of classification. Such a device did not exist in Chinese, given the non-alphabetic nature of the system of language representation.

²¹⁹ This point, emphasised by Needham (1971) following Xia Weiying (1962), had not been noticed by Bretschneider (1893, p. 135, nos 210, 327, 328, 329, 330), who had taken the character to mean 'ugly', an interpretation that obscured this classificatory aspect of the text. Among the many meanings of *chou*, the modern *Zi yuan* dictionary (p. 3140) does describe *tong lei* 同類 and *xiang lei* 相類 as 'of the same category, similar' and *xiang bi* 相比 as 'comparable'.

²²⁰ *Sha* probably designates a kind of pepper tree, *Zanthoxylum* sp. See Bretschneider (1893, p. 135, no 329, and pp. 322–6, nos 497, 498). Another identification as a species of dogwood, *Cornus* sp., seems less probable to the commentators, although the reference to bunches of fruits does make it a possibility.

²²¹ This association of the peach tree *tao* and the plum tree *li* occurs again in the text where three varieties of plum tree are cited after peach varieties, which certainly does confirm the recognition, in practice, of an association between the two folk taxa. See the remark of Tian Shui (1986, p. 7) that agrees with this.

²²² I am here translating *tiao* as 'tassels', for Guo Pu says on the one hand that *tiao* is a synonym for *tu* 荼 and, on the other, that reeds all have *tiao* *hsiu* 芳秀, 'tiao fructifications'. In a fine demonstration that will be presented later (pp. 228–32), Cheng Yaotian identifies *tu* – which appears in poems in the *Shi jing* – with the receptacles of lettuces and sow thistle which, after flowering, 'carry white hairs at the tips of the seeds . . . tens of thousands of them, all identical, well ordered and positioned in a circle like a ball'. The presence of numerous seeds surmounted by plumes on the scapes of reeds as they are on the receptacles of *compositae* may explain this comparison.

²²³ Some designate 'generics', others larger categories, as has already been pointed out.

So when we see that in a lexicographical text the entries are arranged neither by rhymes, nor by any key, nor by the number of characters, we may well wonder whether the simple juxtaposition of terms does not imply a certain thematic grouping. This hypothesis seems to be confirmed in particular by the first four ‘grasses’ cited, all of which are today recognised to be species of the *Allium* genus. It is on the basis of this hypothesis, now presented as a certainty, and taking into account the botanical identifications of the plants named, that Xia Weiyang lists fourteen²²⁴ groups²²⁵ that he assimilates to modern botanical groups such as the *Allium*, *Artemisia*, *Prunus*, *Acer*, *Morus* genera, etc., or to higher taxonomic levels such as algae and fungi. However, even if these groupings cannot be fortuitous, they are only applied to a small number of the plants cited and according to criteria that are not homogeneous: certainly according to morphological similarity and probably also according to usage. Furthermore, the names of other plants that the text identifies as belonging to the same group are, on the contrary, not necessarily juxtaposed, as in the case of mallows, *kui*, for example. It is also clear that the mere juxtaposition of names leads to considering that another group is formed of plants the fruits of which are designated by one specific term; for instance, one group consists of a bean, a cyperus, a cat’s tail, the lotus, small crucifers and ‘male’ hemp, while cereals and bamboos are each split into two groups.

To sum up, the text of the *Er ya* divides plants into two major categories, grasses and trees.²²⁶ This is the basis of one type of popular classification that is common to most human groups, as has been shown by anthropological works ever since the 1970s.²²⁷ Within each of these two categories, by considering, on the one hand, the nomenclature and, on the other, the descriptive vocabulary, it is possible to distinguish various levels in the classification of plants. The basic level corresponds sometimes to that of the botanic species but often to that of the botanic variety or cultivar, as is clearly the case for the eleven jujube trees cited in the text. Nor are the intermediary levels necessarily comparable to botanic genera or families, although

²²⁴ In the presentation of the *Quan fang bei zu*, we have already noted the sequential grouping of plants that share similar properties or characteristics. The persistence of this practice throughout almost fifteen centuries seems to me to justify considering it to be one of the foremost ‘cultural’ ways of classifying objects in China.

²²⁵ Xia Weiyang (1962) explains his way of operating as follows: ‘Ever since antiquity, men have, in the process of production, accumulated countless items of precious knowledge, handed down from one generation to the next; progressively developing, this knowledge has ended up by producing all the contemporary scientific disciplines. And so it is too in the domain of botany. This is what is reflected by a critical examination of the current vocabulary used ever since antiquity right down to the present day. Thus, for example, the fact that *yang* and *liu*, *tao* and *li*, *song* and *bai* etc. are frequently juxtaposed so as to form a single word *yang liu* 楊柳 [willow trees], *tao li* 桃李 [peach trees and plum trees], *song bai* 松柏 [pines and cypresses] etc. expresses their taxonomic meaning successfully. Since these words certainly have been used and, it seems, very widely, one cannot say that in reality they do not convey a trustworthy knowledge. Since these terms existed in a very ancient tradition, it is clear that such knowledge was also very ancient. Such knowledge is fundamentally correct and fundamentally in conformity with modern botanical taxonomy’ (English translation from the author’s French translation). Even if there appear to be certain partial overlaps between botanical and folk taxonomies, it is not possible to agree with the above assertion, which assimilates and confuses the ethnobotanical and the botanical approaches.

²²⁶ We should note here that the text as we know it is not the original one, so it is hard to draw any definitive conclusions.

²²⁷ See for example Brown (1977).

there are sometimes partial overlaps. Take the *tao*, for example. Today the term designates the peach tree. In the *Er ya* three types of *tao* are mentioned: *jing tao* 荆桃, *mao tao* 旄 and *shan tao* 山桃. Guo Pu's commentary explains that the first is 'today [called] *ying tao*' 櫻桃 (a cherry tree), the second is a 'winter peach tree' *dong tao* 冬桃 that ripens its fruit in the winter', while, as for the third, 'its fruits are like peaches but smaller and produce no stones'. This example shows that in practice as reflected in the text of the *Er ya*, the peach tree and the cherry tree were considered to belong to the same *tao* category. The whole *tao* plant group is included in the group called *tao li* 桃李, 'peach tree-plum tree', a sub-category of the *mu* 木, 'trees'. It is therefore tempting to assimilate *tao li*, 'peach tree-plum tree', to the *Prunus* genus of the modern system. But in that case, to what should we correspond the *xing mei* 杏梅 group which likewise associates two recognised species as belonging to the same genus, *Prunus armeniaca* and *Prunus mume*? We should not forget that even if procedures of popular denomination – such as the use of binomes to designate plants – have been taken over by scientific nomenclature, the logic and aims of popular classifications are not those of modern taxonomies. Even if we notice partial overlaps between categories belonging to popular classifications and those belonging to scientific taxonomies, there is no a priori reason to seek the principles of the latter in the text of the *Er ya*.²²⁸

The Er ya : Guo Pu's commentary

The original classification of the plants of the *Er ya* is frequently explained by Guo Pu, who uses a variety of terms to specify the relations between plants. The most frequent is *si* 似 ('resembles'), which appears seventy-two times and establishes a relation either between one plant and another that resembles it or else between a part of a plant and an object with a similar shape. Next comes *ru* 如 ('like'), with twenty-three occurrences, which also indicates a similarity. *Lei* 類²²⁹ ('category') – thirteen occurrences – indicates that two plants belong to the same group, and it is using this term that Guo Pu explains the meaning of *chou* 醜 ('of the same kind', 'similar'), a term that he himself no longer uses. *Shu* 屬 ('to belong to') appears eleven times in these two chapters; if it does indeed indicate a relation of inclusion,²³⁰ Guo Pu would thus be clearly indicating that a plant belongs to a group defined by a generic term. For example, in the case of the sixteenth entry in the chapter on grasses, *bi* 葦: *shu guan* 鼠莞 (rat's rush), Guo Pu writes *yi guan shu ye* 亦莞屬也 – 'it is thus of the *guan* [reed] genus'. Likewise, at the thirty-ninth entry, in the case of a radish, *du* 葵, glossed by *lu fei* 蘆薹 (radish), Guo Pu specifies, '*fei* is used for

²²⁸ On comparisons between scholarly and folk classifications, see in particular Atran (1990), Friedberg (1986). On the principles of folk classifications, see Berlin (1992), Ellen (1993) and Friedberg (1990). The references cited in these three works direct one to an abundant literature on the subject: the first two books offer a synthesis of the points of view of their authors, who differ considerably. Roy Ellen emphasises the essential social dimension of folk categories. Claudine Friedberg's demonstration supports this.

²²⁹ For a historical analysis of the use of *lei*, see Harbsmeier, in *SCC* Volume 7, pp. 218 ff.: 'The concept of a class'.

²³⁰ For an analysis of this term, see Harbsmeier, in *SCC* Volume 7, pp. 241–4: 'The concept of subsumption'.

fu 蔕; the radish belongs to the turnip genus' – *luo fu wu jing shu* 蘆蔕蕪菁屬. As for the term *zhong* 種, 'kind, specific', it appears only three times in the commentary, in these two chapters, and never in a principal text. However, one of the occurrences is very interesting as it explains a rather obscure passage in the *Er ya* in which the term *chou* again appears: 'that which characterises artemesias *fan*: in autumn they become artemesias *hao*' – *fan zhi chou qiu wei hao* 繁之醜秋為蒿.²³¹ This might be interpreted as a case of one plant being transformed into another,²³² but Guo Pu's commentary supplies another explanation: '*chou* is *lei* (category); in the spring each has its specific name (*zhong ming* 種名); when the autumn arrives they grow old and are all uniformly called *hao*'. It is interesting to compare this commentary to the one that Guo Pu produces on *hui* 卉. He writes that it is the 'general term for all grasses', literally 'the one hundred grasses', *bai cao zong ming* 百草總名. These two glosses reveal a perception of two clearly specific levels of denomination: a general denomination *zong ming* in the case of *hui* and a specific denomination *zhong ming* in the present case. Thus, in the 4th century, *zhong*, *shu* 屬 and *lei* 類²³³ seem to be technical words that are already peculiar to the domain of classification, but they are seldom used. *Si* 似 and *ru* 如, which belong to the current descriptive, analogical vocabulary, are on the other hand used far more frequently, almost systematically, and this certainly shows the importance of analogy in the way of associating plants.

The Shuo wen jie zi 說文解字

The *Shuo wen jie zi* by Xu Shen 許慎 (?+58–?+147),²³⁴ presented to the throne in 121, is another dictionary, but of a quite different nature from that of the *Er ya*.²³⁵ The entries are archaic characters in sigillary writing for which the author provides a definition, in many cases very brief, and an etymology. The work is divided into 540 sections, *bu* 部, that correspond to non-autonomous graphic elements or to characters, either simple or composite, that the author has chosen as the graphic and semantic basis for series, more than thirty of which concern the plant world.

²³¹ Bretschneider (1893, no 207). I translate *fan zhi chou* as 'that which characterises', rather than as 'the category'.

²³² On this subject, see the analysis of 'the case of *ju* and *zhi*', in *SCC* Volume 6, Part 1, pp. 103–16.

²³³ We should note that these two terms were to be reused by modern systematists, *shu* in the sense of 'genus' and *lei* in the sense of 'class', where it found itself in competition with *mu* 目, which has today practically replaced it. With regard to neologisms, the Chinese language presents a particular situation: in their graphic form Chinese characters have not undergone significant modifications since the invention of the paintbrush after the beginning of the common era; on the other hand, given that a Chinese character (almost) always carries a meaning, in the course of history one and the same character has frequently been given different meanings in different contexts. Thus, with the introduction or discovery of new notions, the words to designate them have usually been created by resorting to borrowing characters that already exist but are now given a new meaning (Métailié 1981). In cases where the modern terms have a similar meaning or belong to the same semantic field as their homographs, it is not always easy to avoid a certain implicit assimilation and to transfer, to an ancient term, the meaning given in a scientific discipline or a modern technique. We shall find an example in the case of the character *ru* 蕊 in the next chapter.

²³⁴ I must thank Françoise Bottéro for her comments upon reading this passage. Unless otherwise indicated, all the references to the text of the *Shuo wen* are to the Ding Fubao edition (1928).

²³⁵ For an introduction to this important lexicographical work, see Liu Yeqiu (1983, pp. 14–28), Coblin (1993), Bottéro (1996, pp. 15–81).

Some of the 'keys' to these series refer to parts of plants; others designate the plants themselves.²³⁶ We find, in succession, *che bu* 中部, 'young shoot' (107 characters);²³⁷ *cao bu* 艸部, 'grass' (513);²³⁸ *ru* 蓐, 'new shoot from an old grass' (two);²³⁹ *mang* 𦰩, 'a crowd of grasses' (four);²⁴⁰ *zhu bu* 竹部, 'bamboos' (147);²⁴¹ *lai bu* 來部, 'a *Zhou* cereal of good omen' (three);²⁴² *mai bu* 麥部, 'bearded cereal' (thirteen);²⁴³ *shun bu* 薊部, 'a grass' (three);²⁴⁴ *mu bu* 木部, 'tree' (421);²⁴⁵ *lin bu* 林部, 'trees grouped on flat ground' (forest) (nine);²⁴⁶ *cai bu* 才部, 'the beginning of a plant' (one);²⁴⁷ *ruo bu* 𦰪部, 'sacred mulberry tree' (two);²⁴⁸ *zhi bu* 之部, 'to come out, represents a developed grass with a shoot, a branch and a stem' (two);²⁴⁹ *chu bu* 出部, 'to rise up, represents a well developed plant' (five);²⁵⁰ *po bu* 朮部, 'a plant with dense foliage' (six);²⁵¹ *sheng bu* 生部, 'to rise up, represents a plant growing up from the ground' (six);²⁵² *zhe bu* 𦰫部, 'grass leaf' (one);²⁵³ *shei bu* 𦰬部, 'plant with falling leaves and flowers' (three);²⁵⁴ *hua bu* 華部, 'to flower' (two);²⁵⁵ *ji bu* 禾部, 'a tree with bent head that cannot rise up' (three);²⁵⁶ *qi bu* 黍部, 'tree sap that can be used to lacquer objects' (lacquer) (three);²⁵⁷ *ran bu* 𦰭部, 'flower still in bud' (five);²⁵⁸ *han bu* 東部, 'tree with hanging flowers and fruits' (three);²⁵⁹ *diao bu* 𦰮部, 'falling fruits' (three);²⁶⁰ *qi bu* 齊部, 'uniform ears of cereals' (two);²⁶¹ *qi bu* 束部, 'tree needle' (two);²⁶² *pian bu* 片部, 'tree cut lengthwise' (eight);²⁶³ *lu bu* 𦰯部, 'to chop a tree' (one);²⁶⁴ *he bu* 禾部, 'fine cereal' (eighty-seven);²⁶⁵ *li bu* 秝部, 'well spaced' (two);²⁶⁶ *shu bu* 黍部, 'sticky millet' (eight);²⁶⁷ *xiang bu* 香部, 'grass perfume' (two);²⁶⁸ *mi bu* 米部, 'millet grain' (thirty-six);²⁶⁹ *pen bu* 𦰰部, 'to remove the bark from hemp' (two);²⁷⁰ *pa bu* 𦰱部, 'hemp' (three);²⁷¹ *ma bu* 麻部, 'hemp' (four);²⁷² *shubu* 𦰲部, 'bean (pulse)' (two);²⁷³ *duanbu* 𦰳部, 'tip of a young shoot' (one);²⁷⁴ *jiu bu* 韭部, 'name of a vegetable, the one that lasts' (Chinese chive) (six);²⁷⁵ *gua bu* 瓜部, 'with a prostrate root and a weak tip' (melon) (seven);²⁷⁶ *hu bu* 瓠部, 'gourds' (two).²⁷⁷ The choice of placing objects within one of these categories seems to rest upon semantic criteria, as is shown by the case of falling fruits, which concerns only millet grains, *su* 粟,²⁷⁸ and the chestnut

²³⁶ For an account of the group of characters the meanings of which refer to the plant world, see *SCC* Volume 6, Part 1, pp. 117 ff.

²³⁷ Ding Fubao (1928, p. 226a).

²³⁸ Ding Fubao (1928, p. 234a).

²³⁹ Ding Fubao (1928, p. 481a).

²⁴⁰ Ding Fubao (1928, p. 483b).

²⁴¹ Ding Fubao (1928, p. 1906a).

²⁴² Ding Fubao (1928, p. 2300b).

²⁴³ Ding Fubao (1928, p. 2307a).

²⁴⁴ Ding Fubao (1928, p. 2333a).

²⁴⁵ Ding Fubao (1928, p. 2366a).

²⁴⁶ Ding Fubao (1928, p. 2654a).

²⁴⁷ Ding Fubao (1928, p. 2664a).

²⁴⁸ Ding Fubao (1928, p. 2667a).

²⁴⁹ Ding Fubao (1928, p. 2671a).

²⁵⁰ Ding Fubao (1928, p. 2677a).

²⁵¹ Ding Fubao (1928, p. 2683a).

²⁵² Ding Fubao (1928, p. 2690b).

²⁵³ Ding Fubao (1928, p. 2694b).

²⁵⁴ Ding Fubao (1928, p. 2695b).

²⁵⁵ Ding Fubao (1928, p. 2699b).

²⁵⁶ Ding Fubao (1928, p. 2700b).

²⁵⁷ Ding Fubao (1928, p. 2707b).

²⁵⁸ Ding Fubao (1928, p. 3029b).

²⁵⁹ Ding Fubao (1928, p. 3036a).

²⁶⁰ Ding Fubao (1928, p. 3037b).

²⁶¹ Ding Fubao (1928, p. 3042a).

²⁶² Ding Fubao (1928, p. 3044a).

²⁶³ Ding Fubao (1928, p. 3046b).

²⁶⁴ Ding Fubao (1928, p. 3066a).

²⁶⁵ Ding Fubao (1928, p. 3067b).

²⁶⁶ Ding Fubao (1928, p. 3141a).

²⁶⁷ Ding Fubao (1928, p. 3142b).

²⁶⁸ Ding Fubao (1928, p. 3148b).

²⁶⁹ Ding Fubao (1928, p. 3150b).

²⁷⁰ Ding Fubao (1928, p. 3186a).

²⁷¹ Ding Fubao (1928, p. 3188a).

²⁷² *Ma* is defined as 'similar to *pa*', *yu pa tong* 與𦰱同. Commentators consider that *pa* here designates hemp (Ding Fubao 1928, pp. 3188a ff.).

²⁷³ Ding Fubao (1928, p. 3191b).

²⁷⁴ Ding Fubao (1928, p. 3192b).

²⁷⁵ Ding Fubao (1928, p. 3196a).

²⁷⁶ Ding Fubao (1928, p. 3198a).

²⁷⁷ Ding Fubao (1928, p. 3201b).

²⁷⁸ Ding Fubao (1928, p. 3205a).

²⁷⁹ *Setaria italica* (L.) Beauv.

tree, *li* 栗. As Wang Yün 王筠 (1784–1854),²⁸⁰ the author of the *Shuo wen shi li* 說文釋例, points out,

All the names of trees are in the trees section (*mu bu*), with the exception of *li* 栗, which is in the ‘falling fruits’ section (*diao bu*). This is because of the meaning: the chestnut burs²⁸¹ resemble hedgehogs; they ripen in the autumn and open by splitting. The fruits are projected far from the trunk like specks of soot.

The two groups that are most important from the point of view of the names of the plants cited concern the key for grasses (about eighty names) and the key for trees (about 150 names), which confirms the fundamental conceptual division of the plant world as a whole between these two categories that had already been displayed in the *Er ya*. Nevertheless, it should also be pointed out that these two graphic elements are present in the composition of a considerably greater number of characters that designate objects and actions that have nothing directly to do with botany. In this sense they function as markers of a division or categorisation of the world rather than as taxa in a botanical system. A first mode of arrangement *grosso modo* within these categories is linked to the order in which the entries are presented: thus the first trees cited are all fruit trees and are defined as such, *guo*. The next to be cited are the names of trees ‘for wood’, *mu*. In this case, the definitions explain a formal classification. Upon reading them one recognises other generic categories of various kinds, some of which are based on usage: next to *guo* and *mu*, used for trees, I note *cai* 菜, a vegetable plant; *du* 毒, poison; *xiang* 香, a plant with perfume; *yao* 藥, a medicinal plant; *ran* 染, a plant that produces dyes. Other definitions indicate particular characteristics, such as creeping growth, *man* 蔓; a rank smell, *chou* 臭; or resistance to the winter. And then there are others that refer to ecology. Sometimes it is noted that the plant grows in water or alongside running water. Sometimes the very juxtaposition of entries reflects, from our point of view, the account taken of ecological factors in the vicinity of the plants concerned. For example, the names of various aquatic plants are mentioned following the grasses section: reeds, rushes, lotus.²⁸² In other cases, the allocation of certain plants to a category is marked explicitly in the definition. There are two ways of doing this: by using the term *shu* 屬 or by mentioning, as a synonym, a disyllabic name in which the basic character corresponds to a genus. For example, *hao* 蒿, which designates an artemisia, is used as a generic term to which the definitions of various different characteristics refer: *shi* 蓍, *e* 莪, *lin* 荪 are defined by *hao shu* 蒿屬 – ‘of the artemisia group’; similarly, *chen* 菡 is defined as *xiang hao* 香蒿, ‘perfumed artemisia’, and *xiao* 蕭 as *ai hao* 艾蒿, ‘*ai* artemisia’.²⁸³ As in the *Er ya*, one also finds the generic terms of juxtaposed plants used to designate categories. In the tree section, the *zhu* 朱 tree is defined as: ‘a tree with a red heart, in the pine-cypress *song bai* group’.²⁸⁴ When reading the definitions given

²⁸⁰ Cited in Ding Fubao (1928, p. 3040a). ²⁸¹ Literally ‘compartments’, *fang* 房.

²⁸² Ding Fubao (1928, pp. 332a ff.). ²⁸³ Ding Fubao (1928, pp. 341a ff.).

²⁸⁴ *Song bai shu* 松柏屬. See Ding Fubao (1928, p. 2451a).

for the characters that figure as entries under a variety of 'botanical' keys, one also notices that these characters do not solely designate plants. For example, the section devoted to the character *zhu* 竹, meaning 'bamboo', contains very few names of plants. On the other hand it does include vocabulary that relates to the various parts of those plants or to the phases of their development, to reading and to books, or even to the instruments used in daily life and for work in the fields. So, although the *bu* sections that refer to the plant world and contain names of plants may be considered as marking out the major categories that contain the plant group, those categories do not, strictly speaking, correspond to plant groupings but really form complex groups that also include notions and objects that are semantically linked to the plant domain. Nevertheless, if one considers the definitions, the text of the *Shuo wen* certainly does hold an interest for a study of the way in which plants were classified, as the example of the artemesias has just shown. I now propose to provide another example by considering the information provided about various grains. In doing so, I shall try, solely with the help of the internal logic of the text, to introduce some order into the confusion which, as Chang Te-Tze emphasises, exists in the ancient nomenclature.²⁸⁵ The term *gu* 穀 seems to designate this group in the widest sense. It is defined as 'adding; the general name for the one hundred grains'.²⁸⁶ On the basis of the criteria provided solely by the text, it is possible to distinguish the various following sub-groups: *he* 禾, defined as 'excellent grain (*jia gu* 嘉穀), [which] begins to grow in the second month and is ripe by the eighth';²⁸⁷ *mai* 麥, 'bearded grain';²⁸⁸ *ji* 稷, 'the ancestor of grains';²⁸⁹ *peng* 檟, which is synonymous with *huang* 稷 and designates a [kind] of grain, without further details;²⁹⁰ *qiao* 糲, a fast-growing grain;²⁹¹ and *hua*, the best grain, or else a grain without sheaths, *wu pi gu* 無皮穀.²⁹² The definition of the term *hao*, which designates a type of rice, makes it possible to clarify further the meaning of *he* 禾: in a citation from the minister Yi Yin, at the beginning of the Shang dynasty (–1711–1066), it tells us that 'the best cooked grain (*fan* 飯), in Xuan Shan, is the *he* 禾, and in the Nan Hai, it is the *hao* 秔'.²⁹³ This tells us that, in the *Shuo wen jie zi*, rice, *dao* (*tao*) 稻, was not part of the *gu* but designated another group at the same classification level and that the opposition between them was geographical: *tao* (*dao*) types of rice, grains from the south, were contrasted to the *gu*, grains from the north. *Tao* (*dao*) is defined only by the synonym *tu* 秬,²⁹⁴ a term that is itself defined by *tao* (*dao*) 稻.²⁹⁵ *Nuan* 稌 is the name for rice in the principality of Pei.²⁹⁶ Apart from *hao*, four other types of rice are mentioned: we are told that two of them – *fei* 穞,²⁹⁷ 'with a purple stem', and *lian* 稊²⁹⁸ – are not sticky,

²⁸⁵ Chang Te-Tzu (1983, pp. 65–6).

²⁸⁶ Ding Fubao (1928, p. 3120a). As well as 'one hundred grains', one finds in the definitions of the *Shuo wen* the expression 'the five grains', *wu gu*, to designate the whole group of staple foods.

²⁸⁷ Ding Fubao (1928, p. 3067b). ²⁸⁸ Ding Fubao (1928, p. 2307a).

²⁸⁹ Ding Fubao (1928, p. 3082b). It is no doubt on account of an allusion to the founder of the Zhou dynasty, Hou Ji, that this millet is considered the ancestor of grains.

²⁹⁰ Ding Fubao (1928, p. 3118a).

²⁹¹ Ding Fubao (1928, p. 3153b).

²⁹² Ding Fubao (1928, p. 3110a).

²⁹³ Ding Fubao (1928, p. 3094a).

²⁹⁴ Ding Fubao (1928, p. 3091a).

²⁹⁵ Ding Fubao (1928, p. 3091b).

²⁹⁶ Ding Fubao (1928, p. 2902a).

²⁹⁷ Ding Fubao (1928, p. 3082a).

²⁹⁸ Ding Fubao (1928, p. 3093a).

bu nian 不黏. Should we conclude that the others are sticky? We cannot be sure but the fact that one of these types is *jing* (or *geng*) 秔,²⁹⁹ a term that, ever since at least the 3rd century AD, designated sticky types of rice,³⁰⁰ tends to confirm that hypothesis. The last name cited, *li* 秠,³⁰¹ is defined as follows: ‘this year falls, the next year spontaneously grows again’, which probably refers to a pluvial rice that either re-sows itself with the seeds that fall at harvesting time, or is left in place after the harvest and grows again from suckers. The weed par excellence – for it is a plant that depends on mimicry – among cultivated rice that is irrigated, barnyard grass, is also referred to as *bai* 稗.³⁰² The definition of the term *he bie* 禾别, ‘distinct from the *he*’, may stress the fact that, despite the morphological and ecological proximity between the two plants, one is in truth a different object, not a type of *he*. Now let us return to grains, *gu*, starting with the different types of *he*. I have distinguished six: *men* 萁,³⁰³ ‘the best with red shoots’; *qi* 芑,³⁰⁴ ‘the best with a white stem’; *tao* 藁,³⁰⁵ ‘with six spikes to a stem’; *diao* 杓,³⁰⁶ ‘with a single spike’; *pi* 秠,³⁰⁷ ‘with two seeds in each sheath’; and *shu* 黍,³⁰⁸ ‘the sticky one in the *he* group’. Three plants are associated with the latter; they are cited as follows: *mei* 糜, glossed by *ji* 稭,³⁰⁹ with the commentary noting that this is a *shu* that is non-sticky; *qu* 𪎭,³¹⁰ ‘black *shu*, with two seeds to a husk (*fu* 稭)³¹¹ for fermentation’;³¹² *bi* 𪎭,³¹³ adventitious from the *shu*. The text also mentions *kuang* 穰, which is a *Setaria* millet ‘*su* 粟 – bearded’.³¹⁴ If one tries to identify the plants that are described in this way, an interesting trail is provided by the term *su* 粟,³¹⁵ which is defined as ‘fructification of the *jia gu* 嘉穀’ and is attached semantically to the radical *tiao*, which designates ‘the hanging fruits of plants’ (*cao mu* – grasses and trees): this might be a hanging spike the grains of which are called *mi* 米³¹⁶ or *liang* 梁.³¹⁷ From this we may conclude that in the *Shuo wen jie zi*, *he* 禾 – that which is defined as *jia gu*, ‘excellent grain’ – designates the group of foxtail millet varieties.³¹⁸ A complementary indication seems to me to point in the same direction, namely the mention of a plant

²⁹⁹ Ding Fubao (1928, p. 3093b).

³⁰⁰ According to a commentary on the *Han shu* cited in the *Ci yuan* (anon. 1979–84, p. 2298).

³⁰¹ Ding Fubao (1928, p. 3095b).

³⁰² Ding Fubao (1928, p. 3096a). *Echinochloa crusgalli* (L.) Beauv. In anon. (1972–6, Volume 5, p. 164).

³⁰³ Ding Fubao (1928, p. 238b). ³⁰⁴ Ding Fubao (1928, p. 462a). ³⁰⁵ Ding Fubao (1928, p. 3122a).

³⁰⁶ Ding Fubao (1928, p. 3101a). ³⁰⁷ Ding Fubao (1928, p. 3103b). ³⁰⁸ Ding Fubao (1928, p. 3142b).

³⁰⁹ Ding Fubao (1928, p. 3144b). ³¹⁰ Ding Fubao (1928, p. 2175b).

³¹¹ The *Shuo wen jie zi* defines *fu* 稭 as synonymous with *kui* 𪎭 (Ding Fubao 1928, p. 3111a). *Kui* is defined as a synonym of *kang* 糠 (Ding Fubao 1928, p. 3111b). *Kang* is defined by ‘*gu pi* 穀皮, ‘the skin of grains’ (Ding Fubao 1928, p. 3112a). This ‘skin’ can only be the pericarp of the seeds, so it seems to me to correspond to the ball that may contain several flowers, and therefore more than one seed. Perhaps the diversity of the terms that designate the envelopes of the seeds of graminaceous plants reflects the difference in the status of one and the same object considered first as it is on the plant and then after threshing. Alternatively, should one see this as evidence of the different points of view regarding the perception of these floral parts, the definition of which posed quite a few problems for botanists up until the 19th century?

³¹² A drink produced by fermentation from this millet, with a few aromatic herbs added, named *qiang* 鬯, once absorbed, was used to ‘persuade the deities to descend’, *fu yi jiang shen* 服以降神; see Ding Fubao (1928, p. 2167b).

³¹³ Ding Fubao (1928, p. 3145a).

³¹⁴ Ding Fubao (1928, p. 3095a).

³¹⁵ Ding Fubao (1928, p. 3041a).

³¹⁶ Ding Fubao (1928, p. 3150b).

³¹⁷ Ding Fubao (1928, p. 3152a).

³¹⁸ *Setaria italica* (L.) Beauv.

named *you* 莠, which is closely associated, in the text,³¹⁹ with this millet. Now, even in our own day, the weed par excellence in fields of *Setaria* millet (foxtail millet) in China is the *gu you zi* 穀莠子, which seems to be an intermediary form between a wild species, *gou wei cao* 狗尾草,³²⁰ and cultivated *Setaria* millets.³²¹ Another grain in the *gu* group, 'bearded grains, sown in autumn, buried deep', is *mai* 麥.³²² This term *mai* designates barley and wheat. As for the 'mai of good omen', *rui mai* 瑞麥, which was harvested under the Zhou and which, according to a number of commentators, had two grains per sheath, one was named *lai* 來³²³ and was identified as a type of wheat; the other, *mou* 麴, may, according to the same commentator, Xu Kai 徐鍇 (920–74),³²⁴ the author of the *Shuo wen xi zhuan* 說文繫傳, have been barley. Wheat is specifically *xiao mai* 小麥, a term cited in certain definitions of parts of the plant.³²⁵ No variety of either species is cited, but a distinction is drawn between *he* 麩, 'hard mai', and *jian mai* 堅麥,³²⁶ which, according to the commentary of Xu Kai, consists of seeds that are very hard to mill and that remain for a long time under the millstone.

In another category of *gu*, 'the Ancestor of the Five Grains', *ji* 稷,³²⁷ two types are named: *shu* 秫,³²⁸ 'the sticky one', and *ji* 穉,³²⁹ no doubt non-sticky. We may deduce that this was *Panicum* millet. Another term, *hua* 稞, is defined as 'the one that is good among the grains',³³⁰ or 'skinless grain'. The commentary of Gui Fu 桂馥 (1736–1805),³³¹ which is based on the *Si min yue ling* 四民月令 ('Monthly Ordinances for the Four Sorts of People') by Cui Shi 崔寔 of the eastern Han,³³² interprets this term as *qing hua mai* 青稞麥, which 'ripens at the same time as barley and soundlessly yields a fine flour'.³³³ Another term, *qiao* 糲,³³⁴ designates a 'hasty grain'.³³⁵ There are some terms that remain imprecise, such as *peng* 稭,³³⁶ which has as a synonym *peng huang* and designates a 'grain name'. In the opinion of Xu

³¹⁹ The definition of *you* has posed problems for commentators. *He su xia sheng you* 禾粟下生莠 may be understood as 'The *you* grows beneath the millet' or as 'the millet seed falls, the *you* rises'. On the various interpretations, see Ding Fubao (1928, pp. 242b–243b).

³²⁰ *Setaria viridis* (L.) Beauv.

³²¹ See Pernès, Belliard and Métaillé (1979, p. 40). For genetic studies on such hybrids, see Li, Pao and Li (1942) and Li, Li and Pao (1945).

³²² Ding Fubao (1928, p. 2307a).

³²³ Ding Fubao (1928, p. 2300b).

³²⁴ Ding Fubao (1928, p. 2309a).

³²⁵ That of bran, *fu* 麸 for example (Ding Fubao 1928, p. 2310b).

³²⁶ Ding Fubao (1928, p. 2309b).

³²⁷ Ding Fubao (1928, p. 3082b).

³²⁸ Ding Fubao (1928, p. 3089a).

³²⁹ Ding Fubao (1928, p. 3086a).

³³⁰ *Gu zhi shan zhe* 穀之善者 (Ding Fubao 1928, p. 3110a).

³³¹ Ding Fubao (1928, p. 3110b). Gui Fu is the author of the *Shuo wen jie zi yi zheng* 說文解字義證.

³³² For a presentation of this text, see Dong Kaichen (1981, pp. 236–7). See also *SCC* Volume 6, Part II.

³³³ This could be a variety of naked barley (see Chang Te-Tzu 1983, pp. 77–8). As well as the information provided by the quality of the flour, it might be thought, from a philological point of view, that the character 稞 *hua* is derived from the character 裸 *luo*, which means 'naked' and has a graph that is very similar.

³³⁴ Ding Fubao (1928, p. 3153b).

³³⁵ Literally 'grain taken early', *zao qu gu ye* 早取穀也. This term may refer to a selective gathering of the ears or panicles that ripen before the others. This would provide evidence for a practice in ancient China that made it possible for cultivators progressively to produce precocious stock by using the seeds that ripened before the rest as seed for sowing. A commentary by Duan Yuzai (Ding Fubao 1928, p. 3153b; Xu Shen and Duan Yuzai 1992, pp. 330–1), while stating that this term certainly applied to all grains, also notes that in rice-growing regions it might be used to refer to barley, which was harvested early. This barley, sown as a winter crop, would be harvested before any rice was planted.

³³⁶ Ding Fubao (1928, p. 3118a).

Table 6. *A general survey of the main grains cultivated in China before the 3rd century BC from Shuo wen jie zi. There is a clear distinction between sticky (in small capitals) and non-sticky cultivars*

North		South	
gu 穀		hao 秔	
<i>Jia gu</i> 嘉穀 = <i>he</i> 禾 foxtail millet (<i>Setaria</i>)	<i>ji</i> 稷 millet (<i>Panicum</i>)	<i>mai</i> 麥 barley/wheat	<i>dao (tao)</i> 稻 = <i>tu</i> 稌 = <i>nuan</i> 粳 paddy, rice
<i>su</i> 粟, <i>men</i> 薏, <i>qi</i> 芑, <i>tao</i> 粲, <i>diao</i> 杲, <i>pi</i> 秭, <i>kuang</i> 穰	<i>ji</i> 穉	<i>he</i> 𪎭, <i>lai</i> 來, <i>mou</i> 𪎮, <i>jian mai</i> 堅麥	<i>fei</i> 穞, <i>lian</i> 稭
<i>shu</i> 黍, <i>qu</i> 𪎱 <i>ji</i> 稭	<i>shu</i> 秭		<i>jing (geng)</i> 秬; <i>li</i> 秳

Kai,³³⁷ this is a variety of rice, while Zhu Junsheng³³⁸ (1788–1858) thinks it is a yellow and non-sticky variety of foxtail millet. Finally, *mei* and *ji* are simply defined by one another. *Mei* 糜³³⁹ may be a dialectal variant of *ji* 稭³⁴⁰ that also designates a non-sticky variety of foxtail millet, *shu*.³⁴¹

Table 6 sums up the distinctions between grains that the help of the sole text of the *Shuo wen jie zi* makes it possible to establish. By comparing this result to the table that Francesca Bray produced of the names of millets in Chinese,³⁴² one is bound to recognise the difficulties of the problem of the identification of these ancient terms. An enquiry carried out today in the different regions of China, among farmers cultivating millet, would seem further to confirm the persistence of problems of homonymy, in particular among terms designating sticky and non-sticky varieties of the two cultivated species.³⁴³

The Quan fang bei zu

Remaining within the domain of encyclopaedic texts, I shall now simply note the classification system of a work that has already been mentioned,³⁴⁴ and that is devoted exclusively to plants, the *Quan fang bei zu*, by Chen Yong (zi: Jingyi), printed around 1256. In his preface, the author divides the plants into four groups: flowers, grasses, fruits and trees. However, in the body of the text, he successively tackles the

³³⁷ Cited by Ding Fubao (1928, p. 3118b).

³³⁹ Ding Fubao (1928, p. 3144b).

³⁴¹ Note by Ding Fubao (1928, p. 3090b).

³⁴³ If one takes , for example, the case of *Panicum* millets, two recent floras (Geng 1965, p. 656; anon. 1972–6, Volume 5, p. 158) indicate that three terms, *ji* 稷, *shu* 黍 and *mi* 糜, are synonyms. I myself have noticed that in Liaoning, in Shenyang, *ji* serves to designate the species in general and the non-sticky form, while *mi zi* is the name for the sticky form. In Shaanxi (Shenxi), in Xi-an, in contrast, *mi zi* was the general term for the species while *ji* and *shu* respectively designated the non-sticky forms and the sticky ones (following Pernès, Belliard and Métaillé 1979, p. 40).

³⁴⁴ See pp. *** above.

³³⁸ Cited by Ding Fubao (1928, p. 3118b).

³⁴⁰ Ding Fubao (1928, p. 3090b).

³⁴² See SCC Volume 6, Part II, p. 440.

eight following categories: flowers, *hua*; fruits, *guo*; grasses, *hui*; grasses, *cao*; trees, *mu*; grains and mulberry trees, *nong sang*; vegetables, *shu*; and medicinal plants, *yao*. I have shown that this is not a botanical classification but a practical one, aiming to regroup citations relating to the subject of plants in all their diverse forms. Some plants figure in a number of rubrics, as flower, fruit, etc., and it seems to me that the determining factor in the order of their presentation is their agricultural and cultural importance.

The Nong shu 農書

Another text, which is later and very technical, is the *Nong shu* (Book of Agriculture) by Wang Zhen 王禎, the preface of which is dated 1313.³⁴⁵ Plants are considered in the second part, entitled 'Treatise of the One Hundred Grains', *Bai gu pu* 百穀譜. They are the subject of eighty rubrics, *mu* 目, divided into ten chapters. Successively, the categories that are presented are those of grains, *gu shu* 穀屬; the fruits of grasses, *luo shu* 蓏屬; vegetables, *shu shu* 蔬屬; the fruits of trees, *guo shu* 果屬; those of bamboos and trees, *zhu mu* 竹木; and finally those of other 'diverse' plants, *za shu* 雜屬. The order in which these useful plants are presented reflects their importance for family economies: under 'diverse' the plants noted are for textiles, dyeing, medicines and tea, while the ones that are noted first are those that provide the basis of nourishment, cereals and vegetables, which are followed, logically enough, 'by vegetables and fruits [that are] what make up for the insufficiency of grains', as the author puts it.³⁴⁶

Interlude: the classifications of plants up to the Song period

At this stage of our analysis, it is possible to suggest a few generalisations: up until the 7th century, the texts present different modes of arranging plants, depending on the contexts within which they are considered. The degree of toxicity (and its therapeutic activity) associated with the plant's taste and therapeutic nature are fundamental for plants that constitute *materia medica*; the type of plant (grass or tree), its current use (as a fruit, vegetable or staple food) and the way in which it is appropriated (by gathering or through cultivation) are secondary criteria when it comes to organising all this *materia medica* of plant origin. These criteria, which are secondary for medicinal plants, are, in contrast, the first to be taken into consideration in an agricultural treatise presenting plants that have a use.

On the other hand, the fruit appears to represent an important criterion of differentiation. It is the basis of the principle of the only classification that is fairly clearly explained in the *Er ya*'s chapter devoted to trees. This mode of organisation seems to me to reflect the popular classification that constantly underpins other more technical ways of representing plant groups.

³⁴⁵ I am using the edition prepared by Wang Yuhu (1981a).

³⁴⁶ Wang Yuhu (1981a, p. 77).

From a linguistic point of view, there is a basic level that includes terms such as *tao*, ‘peach tree’; *zhu*, bamboo; *song*, ‘pine’. At the linguistic level these basic terms generally designate generic categories. They include taxa from a lower level that are designated by plurisyllabic terms that are constructed by definition, such as *ying tao*, *jian zhu*, and are themselves part of intermediary categories that are designated by binomes such as *tao li*, *song bai*, etc. which are constructed by the juxtaposition of morphemes. Of course, these folk categories do not necessarily correspond to the precise levels of modern botanical taxonomy. Consider, for example, the case of the *gua* 瓜. This term, which may be translated as ‘marrow’, refers first to a particular type of fruit that belongs to a botanical family, a fact that explains how it is that most of the plants the names of which are formed from this basis belong to the Cucurbitaceae family. However, not all the Cucurbitaceae named in popular Chinese are *gua*. The *Qi min yao shu*, indeed, mentions gourds, which form another large category designated by *hu* 瓠,³⁴⁷ while this same text assimilates aubergines, from the Solanaceae family, to *gua*. We can see from this that there is no more than a partial overlapping between the semantic field of *gua* in ancient China and the botanical family of the Cucurbitaceae. In the case of *ma* 麻, most of the binomes from which names are constructed on this basis even designate plants that belong to genera and botanical families that are clearly different; here, the popular referent is the nature of the fibres of these plants that supply the primary material for a variety of textiles and also the use of grains for the extraction of oil. Given that systematic botanists do not take into consideration the textile value of the fibres of plants or the oil-bearing character of grains, it is not surprising that we do not, in this case, find any overlapping between modern botanical classifications and popular Chinese classification. Finally, medicinal plants, considered from the point of view of their pharmacodynamic properties, are divided into three major categories, three grades, *san pin*, in accordance with their degree of toxicity. The principles of the use of products in preparations reveal another classification into four major categories that overlap the preceding one and that refer to the functions of the principal actors in the government of society: prince, minister, assistant and messenger, *jun chen zui shi* 君臣佐使.³⁴⁸ According to a principle set out in the *Huang di nei jing su wen*, in the chapter ‘Zhi zhen yao da lun’, in order to act efficaciously, a medicament must be organised. ‘Prince’, *jun*, designates the components – several drugs may be associated – that are the most active in the therapeutic process of any preparation. ‘Minister’ covers the drugs used as adjuncts or catalysts in the action of the ‘prince’. ‘Assistant’ designates the drugs that reinforce the ‘prince’ or control secondary effects. As for the ‘messengers’, their function is to guide the medicaments to the parts of the body that are affected by the malady and to harmonise the actions of the various constituents of the medicament.

³⁴⁷ *Lagenaria siceraria* (Molina) Standl.

³⁴⁸ See pp. 37–8 above.

Another reference to the social hierarchy that is no longer concerned with categories but that does recognise the ranking of various trees is to be found in the context of funerary rites. A definition in the *Shuo wen jie zi*³⁴⁹ records that 'the tree of the son of Heaven is the pine (*song*); that of his feudal followers, the cypress (*bai* 柏);³⁵⁰ that of the grand dignitaries, the 'pride of India' or soapberry (*luan* 欒);³⁵¹ and that of the literati, the willow (*yang* 楊)'.

Opinions vary regarding the supposed theoretical bases of the classification of natural objects in ancient China. For some,³⁵² the influence of Confucian philosophers and jurists is crucial; for others, who refute that hypothesis,³⁵³ it is the theories of *yin-yang* and the Five Phases that are fundamental. In the absence of any explicit information on the subject from the authors of classifications, it is hard to come to a definitive conclusion. I have indicated the importance of references to the categories defined by the Five Phases and *yin-yang* theories, and those of the Five Phases undeniably constitute one of the keys to understanding how the various classificatory systems of *materia medica* function. However, the writings of Xun Zi and Mo Zi may also have played a role, although not necessarily at the same level. The popular classification to which I have drawn attention may have been noted by the philosophers of antiquity who, on that basis, may have elaborated theoretical discourse concerning the 'correction of names', *zheng ming* 正名, for instance the three fundamental types of naming that are defined by Mo Zi: *da* 大, general; *lei* 類, generic; and *si* 私,³⁵⁴ specific. As for Xun Zi, he too recognised different types of naming:³⁵⁵ the widest, 'the name of a large group', *da gong ming* 大共名, in which *wu* 物, 'thing' is an example; below this, 'the name of great differentiation', *da bie ming* 大別名, with, as an example, *qin* 禽, 'flyers' and *shou* 獸, 'terrestrial animals'; and then 'the name of a thing', *shi ming* 實名, which refers to a name corresponding to a recent consensus and therefore to a meaning not yet quite established, as opposed to an 'excellent name', *shan ming* 善名, with a meaning recognised by all.³⁵⁶ As for the principles of differentiation, Xun Zi declares,

Those for things that have a similar form and a different substance, or a different form and a similar substance, can be differentiated. That which has a similar form but becomes of different substance, although it can be grouped together, it is named [as] two realities. That which has a form that changes but the reality of which does not change but becomes different: this is called transformation; when there is transformation but no differentiation, that is called a single reality.³⁵⁷

³⁴⁹ On the *luan* tree, see Ding Fubao (1928, p. 2424a).

³⁵⁰ *Cupressus funebris* Endl. (Jia Zuzhang and Jia Zushan 1955, p. 1228).

³⁵¹ *Koelreuteria paniculata* Laxm. (Jia Zuzhang and Jia Zushan 1955, p. 465).

³⁵² See Chen Jiarui (1978).

³⁵³ See Gou Cuihua and Xu Kangsheng (1982).

³⁵⁴ On the Mo Zi texts relating to classification, see Tan Jiefu (1981).

³⁵⁵ See Zhang Shitong (1974, p. 248).

³⁵⁶ The two types of name noted in Guo Pu seem to me to correspond to an intermediary level, *zong ming* <*da bie ming* and to a lower level, *zhong ming* <*shi ming* or *shan ming*.

³⁵⁷ Zhang Shitong (1974, p. 248), English version of author's French translation.

I myself think that while the theories of *yin-yang* and the Five Phases served as references for the ‘scholarly’ classifications that appear in technical works – treatises on *materia medica*, *ben cao*, in particular – it was popular knowledge and, more precisely, the way in which agricultural workers classified plants that inspired the thinking of philosophers.

(ii) *The Ming and Qing dynasties: works of materia medica*

The Jiu huang ben cao 救荒本草

Despite the mention of *ben cao* 本草 in its title, the first text presented here is not strictly speaking a pharmacopoeia. This should remind us that the term *ben cao* is polysemic and may signify not only ‘*materia medica*’ or ‘a work of *materia medica*’, but also, quite simply, ‘plants’. The *Jiu huang ben cao* (Treatise on Plants for Use in Emergency), published in 1406, is the work of a philanthropic prince, Zhu Xiao 朱橚 (c.1360–1425) the fifth son of Emperor Hongwu 洪武. His declared intention in composing this book was to make it a tool to help people to survive in periods of famine by eating all possible parts of plants. As this work has already been studied at length by Joseph Needham and Lu Gwei-djen,³⁵⁸ at this point we shall be considering only the way in which the plants are classified.

The group of 414 plants taken into account is arranged into three levels. Within the large basic division which, ever since Tao Hongjing, separated *materia medica* into five sections, namely grasses, trees, grains, fruits and vegetables, the author grouped the various species, *zhong* 種,³⁵⁹ into categories defined by the food resources that they offered. In this way, the fifteen subdivisions are labelled, in a summary of the work, as follows: ‘edible leaf’, *ye ke shi* 葉可食, 237 species; ‘edible fruit’, *shi ke shi* 實可食, sixty-one species; ‘leaves and fruit all edible’, *ye ji shi jie ke shi* 葉及實皆可食, forty-three species; ‘edible root’, *gen ke shi* 根可食, twenty-eight species; ‘edible root and leaves’, *gen ye ke shi* 根葉可食, sixteen species; ‘root and fruit all edible’, *gen ji shi jie ke shi* 根及實皆可食, five species; ‘edible root and shoot’, *gen sun ke shi* 根筍可食, three species; ‘edible root and flower’, *gen ji hua ke shi* 根及花可食, two species; ‘edible flower’, *hua ke shi* 花可食, five species; ‘edible flower and leaves’, *hua ye ke shi* 花葉可食, five species; ‘flower, leaf and fruit all edible’, *hua ye ji shi jie ke shi* 花葉及實皆可食, two species; ‘leaf, rind and fruit all edible’, *ye pi ji shi jie ke shi* 葉皮及實皆可食, two species; ‘edible stem’, *jing ke shi* 莖可食, three species; ‘edible shoot’,³⁶⁰ *sun ke shi* 筍可食, one species; ‘shoot and fruit all edible’, *sun ji shi jie ke shi* 筍及實皆可食, one species. This inventory

³⁵⁸ See SCC Volume 6, Part 1, pp. 331–48.

³⁵⁹ In the precise case of this book, most of these *zhong* in fact correspond to botanical species. See the identification proposed by Read (1946).

³⁶⁰ This term *sun* more specifically designates the bamboo shoot, but also the swollen base of the stem of the zizania (*Zizania caduciflora* (Turcz.) Hand.-Mazz.) *jiao sun* 茭筍 or *jiao bai* 茭白. This abnormal growth results from the action of a mushroom *Ustilago esculenta* Henn., which also makes the plant sterile. Nowadays known usually by the name *jiao bai*, this part of the plant is one of the most highly valued ingredients of Chinese cuisine. See Wu Gengmin (1957, pp. 159–67).

testifies to precise observation of all the plants cited and also to the prince author's systematic approach to his undertaking. His empirical way of proceeding is further confirmed by the fact, stated in the preface, that he arranged for all these plants to grow in a garden so that he could study them thoroughly.³⁶¹ The system for the arrangement of the plants in the *Jiu huang ben cao* is thus a hybrid one;³⁶² it follows the categories of Tao Hongjing at the upper level and opts for a functional arrangement based on the edibility of the parts of each plant considered at the intermediate level. The text that follows will also demonstrate the use of a classic model that is adjusted according to a variety of criteria (see Table 7).³⁶³

The Ben cao pin hui jing yao 本草品彙精要

The *Ben cao pin hui jing yao* (Essentials of the Pharmacopoeia Ranked According to Nature and Efficacy), ordered by imperial command and still in manuscript form, was completed in 1505. It has already been described, so I shall simply develop that presentation further, from the point of view of classification. If we first consider the summary, we find that plants and other products of plant origin, forming a total of 640 entries, are divided into five sections, *bu* 部, namely grasses, *cao* 草; trees, *mu* 木; fruits, *guo* 果; edible seeds, *mi gu* 米穀; and vegetables, *cai* 菜. This collection of plants does not appear to be divided into separate groups in this work. Following the example set by the *Zheng lei ben cao* 證類本草, the grasses and trees come after the section on products of mineral origin, *yu shi* 玉石, while, among the sections devoted to trees and three other types of product of plant origin, we find sections devoted to products of human and animal origin. We again find this division into five groups, which is based on whether or not the plant products are used as foodstuffs and was set up once the *Shen nong ben cao jing* 神農本草經 was revised by Tao Hongjing.³⁶⁴ The distribution of products within each of these five sections is determined by three categories, the 'three ranks', *san pin*,³⁶⁵ that correspond to the pharmaco-dynamic properties attributed to *materia medica* and that constituted the first and only global distribution of *materia medica* in the *Shen nong ben cao jing*. This reading of the summary of the work confirms its structural link to that of the *Zheng lei*

³⁶¹ An analogous empirical way of proceeding is to be found in a similar piece of information, in which it is not so much a matter of warding off famine as of suggesting new vegetables that could increase the meagre choices then available in the winter period. The authors were two European naturalists, Pailleux and Bois, who in 1879 published a preliminary account of their researches in which their culinary experiments in particular are described. See Pailleux and Bois (1879, 1892).

³⁶² See SCC Volume 6, Part 1, pp. 302–8. See also Okanishi Tameto (1977, pp. 197–209); Unschuld (1986, pp. 128–45).

³⁶³ This division, which may initially seem 'natural', seems to me, in fact, to be extremely cultural. It certainly corresponds to the development of the great 'natural' and more or less universal separation of plants into 'grasses' and 'trees', which is already to be found in the *Er ya*. However, the *cao* grasses are distributed, according to the use that is attributed to them, between wild herbaceous plants that are either foodstuffs or medicinal; staple foods, *gu*; and edible plants, *cai*. The category of fruits, *guo*, is ambiguous, for it includes the fruits of trees, which certainly corresponds to the literal sense of *guo*, but also those of grasses, for which, however, there exists the generic term *luo* 蒻, but which does not appear in the various classificatory systems to be found at the same level as *guo*. Furthermore, *mu*, tree, includes ligneous plants that are used for their parts other than fruits.

³⁶⁴ See SCC Volume 6, Part 1, p. 247.

³⁶⁵ See above, p. 37.

Table 7. *Classification of plants in Jiu huang ben cao (1406) by Zhu Xiao 朱橚. Within the five main sections chosen by Tao Hongjing for the plant materia medica, species are grouped together on the basis of the various parts of plants which are eaten*

	Grasses, <i>cao bu</i> 草部	Trees, <i>mu bu</i> 木部	Grains, <i>mi gu bu</i> 米谷部	Fruits, <i>guo bu</i> 果部	Vegetables, <i>cai bu</i> 菜部
Leaf, <i>ye</i>	+++	+++			+++
235 species	(161)	(41)			(33)
Root, <i>gen</i>	+++			+++	+++
28 species	(24)			(2)	(2)
Fructification	+++	+++	+++	+++	
61 species	(20)	(20)	(7)	(14)	
Leaf + fructification	+++	+++	+++	+++	+++
42 species	(11)	(8)	(13)	(5)	(5)
Root + leaf	+++				+++
16 species	(11)				(5)
Shoot + root	+++				
3 species	(3)				
Root + flower	+++				
2 species	(2)				
Root + fructification	+++			+++	+++
5 species	(2)			(2)	(1)
Flower		+++			
5 species		(5)			
Flower + leaf	+++	+++			
5 species	(4)	(1)			
Flower, leaf + fructification		+++			
2 species		(2)			
Leaf, bark + fructification		+++			
2 species		(2)			
Stem	+++				
3 species	(3)				
Bamboo shoot		+++			
1 species		(1)			
'Shoot' + fructification	+++				
1 species	(1)				
Total number of eaten species	242	80	20	23	46

ben cao, which seems normal enough given that the latter text was the reference model for the authors. Here, then, is a brief account of the classification of the products used as *materia medica* in this book. It is based on a combination of two different classificatory principles (see Table 8).

A perusal of the introduction, *fan li* 凡例, will now throw some light on the choices made in the presentation of each entry.

Table 8. *Presentation of materia medica in Ben cao pin hui jing yao (1505)*

Fascicules, <i>juan</i> 卷	Sections, <i>bu</i> 部	Grades/ranks, <i>pin</i> 品
1 to 6	玉石 <i>yu shi</i> , jades, stones	Upper, medium, lower
7 to 15	草 <i>cao</i> , herbs	Upper, medium, lower
16 to 21	木 <i>mu</i> , trees	Upper, medium, lower
22	人 <i>ren</i> , human (products)	
23 to 25	獸 <i>shou</i> , beasts	Upper, medium, lower
26 to 28	禽 <i>qin</i> , birds	Upper, medium, lower
29 to 31	蟲魚 <i>chong yu</i> , beasts, fishes	Upper, medium, lower
32 to 34	果 <i>guo</i> , fruits	Upper, medium, lower
35 to 37	米穀 <i>mi gu</i> , grains	Upper, medium, lower
38 to 40	菜 <i>cai</i> , vegetables	Upper, medium, lower
41	Herbs not mentioned in classical texts	
	Trees, lianas not mentioned in classical texts	
42	有名未用 <i>you ming wei yong</i> , named (but) not used:	
	玉石類 <i>yu shi lei</i> , jades, stones category	
	草木類 <i>cao mu</i> , herbs, trees category	
	蟲類 <i>chong</i> , small beasts, insects	

The information contained in the text is distributed between twenty-four rubrics that are described as follows:³⁶⁶

1. name, *ming* 名, notes the synonyms;
2. shoot, *miao* 苗, describes growth;
3. place, *di* 地, records the place of origin;
4. time, *shi* 時, is divided into a period of growth and one of harvesting;
5. harvest, *shou* 收, notes the methods of conservation;
6. usage, *yong* 用, indicates the part used;
7. quality, *zhi* 質, evaluates its aspect;
8. colour, *se* 色, differentiates between dark green, yellow, red, white and black;
9. taste, *wei* 味, notes acidic, spicy, sweet, sour, salty;
10. nature, *xing* 性, differentiates between cold, hot, warm, fresh, constricting, relaxing, slowing, hardening, softening;
11. material force, *qi*³⁶⁷ 氣, whether thick or thin, *yang* 陽 or *yin* 陰, has the function of raising or lowering;
12. stink, *chou* 臭, notes in detail a smell of fish, of goat, fragrance, stink, smell of rotten wood;

³⁶⁶ Liu Wentai (1982, p. 15). Author's French translation put into English.

³⁶⁷ I have chosen to use the term forged by Chan Wing-tsit (1967, p. 360), 'material force', to translate this term that designates a subtle energy. According to a contemporary work of Chinese medicine (anon. 1974b, p. 20), this notion has two meanings. On the one hand it means a physiological force and on the other extremely fine matter that has a nutritive function.

13. treatment, *zhu* 主, demonstrates aptness for one illness or another;
14. moving, *xing* 行, shows which meridian is concerned;
15. aiding, *zhu* 助, notes what drug it assists;
16. opposing, *fan* 反, notes what drug it is antagonistic to;
17. fabrication, *zhi* 製, specifies grilling, reduction, roasting, torrefaction (roasting);
18. cure, *zhi* 治, describes therapeutic use;
19. associated cure, *he zhi* 合治, considers the associated results;
20. prohibition, *jin* 禁, is a warning designed to alleviate posology;
21. replacing, *dai* 代, indicates falsifications;
22. to avoid, *ji* 忌, explains which drug to shun;
23. to liberate, *jie* 解, explains antidotes;
24. false, *yan* 贗, distinguishes the true from the false.

The content of several of these twenty-four rubrics refers to a number of different classificatory systems. The content of rubrics 8 to 12 refers to formalisations based on the *wu xing* 五行, the Five Phases. In the seventh, 'quality', *zhi*, reference to the morphology of the plant resorts to analogy. Thus the tangerine tree, *ju* 橘, is related to the pommelo, *you* 柚,³⁶⁸ *you*, in its turn, refers to *cheng zi* 橙子, the Seville orange tree,³⁶⁹ which refers back to the tangerine tree, *ju*. The following information, still about plants, then follows:³⁷⁰

Grasses, trees, grains, vegetables and fruits are divided, in accordance with the *Huang ji jing shi shu* 皇極經世書 (Book of the Sublime Principle Which Governs All Things within the World) (c.1060) [by Shao Yong 邵雍 (1011–77)], into four categories (*si lei* 四類): *cao* 草, *mu* 木, *fei* 飛, *zou* 走. [Thus] for the grasses there is *cao zhi cao* 草之草, *cao zhi mu* 草之木, *cao zhi fei* 草之飛 and *cao zhi zou* 草之走 and so on for trees, cereals, fruits and vegetables so that all the characteristics of the plant are identified.

I am taking over the translations suggested by Joseph Needham and Lu Guei-djen for the four categories that correspond to the virtues of plants:³⁷¹ crouching-ness or herbarity for *cao*; aspiring dendrity, tree-ness or arbority for *mu*; flight or volity for *fei*; and creeping and all terrestrial locomotion or repety for *zou*. A statistical view helps one to understand this division. Some 640 entries concern plants, as has been noted; *fei* is used in three cases only:³⁷² only one grass, *mao* 茅, *Imperata sp.*, possesses volity, as do two trees, *bai* 柏, the weeping cypress,³⁷³ and *zhu* 竹, the bamboo. In contrast, 262 grasses out of 322 are characterised by *cao zhi cao* and thus possess herbarity, while 140 trees out of 157 are classed as *mu zhi mu*, 木之木, possessing arbority. In the case of fruits, *guo*, this system makes it possible to distinguish those that are produced by trees, *guo zhi mu* 果之木, such as jujubes, from those produced by herbaceous plants, *guo zhi cao* 果之草, such as sugar cane, and those that grow on

³⁶⁸ On citrus fruit, see *SCC* Volume 6, Part 1, in particular pp. 103–16 and 363–77.

³⁶⁹ *Lei xiang cheng er da* 類象橙而大, 'like the Seville orange but bigger'. ³⁷⁰ Liu Wentai (1982, p. 16).

³⁷¹ See *SCC* Volume 6, Part 1, pp. 304–8.

³⁷² Probably the way that the foliage of these three plants reacts to the wind explains this choice.

³⁷³ *Cupressus funebris* Endl. (= *C. pendula* Lambert); Jia Zuzhang and Jia Zushan (1955, Fig. 2141).

Table 9. *Distribution in the Ben cao pin hui jing yao (1505) of the five categories of plants of the materia medica based on the qualities attributed in the Shao Yong system.*

	cao 草 grasses	mu 木 trees	guo 果 fruits	gu 穀 grains	cai 菜 vegetables
cao 草 'herbarity'	262	4	10	24	25
mu 木 'arbority'	19	139	30	15	7
zou 走 'repety'	40	16	4	4	13
fei 飛 'volity'	1	2	0	1	0

lianas, and are endowed with 'repety' and classed as *guo zhi zou* 果之走, the grape, for example. Table 9 shows the distribution of the various categories of *materia medica* that are based on the four characteristics attributed to plants in the Shao Yong system.

Another criterion that serves to characterise each plant individually is its mode of growth. On this subject, the introduction, *fan li*, runs as follows:

Plants do not all grow in the same fashion. Those that grow in a particular way are [described as] special (*te sheng* 特生), those that spread out in a disorderly way are [described as] spread out (*san sheng* 散生), those that grow upright are [described as] upright (*zhi sheng* 直生), those that grip and climb are [described as] climbing (*man sheng* 蔓生), those that lean on and adhere to other trees are [described as] parasites (*ji sheng* 寄生), those that attach themselves to walls and surfaces are [described as] attached (*li sheng* 立生), those that emerge from the mud are [described as] muddy (*ni sheng* 泥生). In each case we describe this particularity in order to help with the harvesting.³⁷⁴

A more precise idea of the criteria used to arrange drugs in the various categories is conveyed in another article in this introduction, which explains that

there are drugs that are used today but that the ancient texts did not mention ... It is by analysing their form (*xing* 形), their quality (*zhi* 質), their nature (*xing* 性) and their taste (*wei* 味) that we can now establish for each one an additional rubric that is added within the various sections.³⁷⁵

By reading the various rubrics we can further refine the information provided by the preceding inventory. Certain products, such as thunder pills, *lei wan* 雷丸,³⁷⁶ are 'born from the earth', *tu sheng* 土生; a seaweed, 'the deer's horn vegetable', *lu jiao cai* 鹿角菜,³⁷⁷ is 'born from the sea', *hai sheng* 海生; while various other plants 'grow in clumps', *cong sheng* 叢生.

³⁷⁴ Liu Wentai (1982, p. 16). ³⁷⁵ Liu Wentai (1982, p. 16).

³⁷⁶ Liu Wentai (1982, p. 547). *Polyporus mylittae* Cook and Mass. (anon. 1977b/5148). Hu Shiu-ying (1980, p. 59).

³⁷⁷ Liu Wentai (1982, p. 893). *Chondrus ocellatus* Holmes; Jia Zuzhang and Jia Zushan (1955, Fig. 2345, Read, Fig. 858).

Let us now examine how the plants and plant products have been arranged within these groups defined by the principles that govern the work's organisation and the classification of the objects, adopted by the authors under Liu Wentai's direction, as mentioned above. To do this, it is necessary to compare the summaries in this work with those in the *Zheng lei ben cao*. By way of an example, let us consider the section devoted to grasses, *cao bu*. Each of the three subdivisions – *shang pin* 上品, *zhong pin* 中品 and *xia pin* 下品 – is in its turn divided into two parts, *shang* 上 and *xia* 下, in the *Zheng lei ben cao*. The *Ben cao pin hui jing yao* divides its entries into three parts: *shang*, *zhong* and *xia*. Let us consider the first part of the first chapter on 'grasses'.³⁷⁸ The order in which the entries are presented is the same as that of the corresponding chapter of the *Zheng lei ben cao*.³⁷⁹ All the modifications made to this model are justified. Thus *di huang*, 地黃,³⁸⁰ the Chinese foxglove, benefits in the *Zheng lei ben cao* from an entry: *gan di huang* 乾地黃, 'dried foxglove'.³⁸¹ The *Ben cao pin hui jing yao* gives it two entries,³⁸² noting that 'originally no distinction was made between raw and cooked foxglove; now it is divided into [two] rubrics'. Similarly, under *cang shu* 蒼朮³⁸³ we find that in the *ben cao* no distinction was made between *cang shu*³⁸⁴ and *bai shu* 白朮,³⁸⁵ although the former encourages sweating while the latter has the contrary effect; hence the choice of two distinct entries. In the case of *qiang huo* 羌活,³⁸⁶ the text states, 'originally this was annexed to *du huo* 獨活,³⁸⁷ now it is separated into (two) rubrics'.³⁸⁸ The same goes for *qing mu xiang* 青木香, which is separated from *mu xiang* 木香.³⁸⁹ For the entry *shan yao* 山藥,³⁹⁰ yam, we are told,

³⁷⁸ Entitled *cao bu shang pin zhi shang* 草部上品之上, 'first part of the [drugs] of the top degree of the grasses section', it appears in Liu Wentao (1982, pp. 219–47).

³⁷⁹ I am using as reference texts a new edition, produced in Peking in 1957, of the *Chong xiu zheng he jing shi zheng lei bei yong ben cao* 重修政合經史證類備用本草 (1249), edited under the direction of Cao Xiaozhong 曹孝忠, in Ping-yang 陽, and also a late edition, produced in Tokyo in 1970, of the *Jing shi zheng lei da guan ben cao* 經史證類大觀本草, published in 1904 in Wu-chang by Ke Pengshi 科彭士, based on the revised edition of Ai Shengzeng 艾晟增. On the various editions of the *Zheng lei ben cao*, see in particular Long Bojian (1957, pp. 20–7) and Okanishi Tameto (1975, pp. 117–46).

³⁸⁰ *Rehmannia glutinosa* Libosch. (= *R. lutea* Maxim.); Jia Zuzhang and Jia Zushan (1955, Fig. 0276; Hu Shiu-ying (1980, no 1523).

³⁸¹ See Tang (1957, p. 149). ³⁸² See Liu Wentai (1982, pp. 228–9).

³⁸³ *Atractylodes* sp. Hu Shiu-ying (1980), no 1680; Liu Wentai (1982, p. 229).

³⁸⁴ *Atractylodes lancea* (Thunb.) DC.; anon. (1977b, Fig. 2174).

³⁸⁵ *Atractylodes macrocephala* Koidz.; anon. (1977b, Fig. 1376).

³⁸⁶ *Notopterygium incisum* Ting; Hu Shiu-ying (1980, no 0109); anon. (1977b, Fig. 2386); cf Liu Wentai (1982, p. 237).

³⁸⁷ *Du huo* still today remains a generic term, and several species of Umbellifers and one Araliaceae are used as *materia medica* under that name: *Angelica pubescens* Maxim. F. *biserrata* Shan and Yuan; anon. (1977b, Fig. 3510); *Angelica pubescens* Maxim.; anon. (1977b, Fig. 3510), Hu Shiu-ying (1980, no 1748); *Angelica porphyrocaulis* Nakai and Kitaj.; anon. (1977b, Fig. 3510), Hu Shiu-ying (1980, no 1748); *Heracleum hemsleyanum* Diels.; anon. (1977b, Fig. 3510), Hu Shiu-ying (1980, no 1748); *Heracleum lanatum* Michx.; anon. (1977b, Fig. 3510), Hu Shiu-ying (1980, no 1748); *Aralia cordata* Thunb.; anon. (1977b, Fig. 3510), Hu Shiu-ying (1980, no 1748).

³⁸⁸ *Aristolochia debilis* Sieb. et Zucc.; anon. (1977b, Fig. 2496), Hu Shiu-ying (1980, no 0219); *Aristolochia contorta* Bge.; anon. (1977b, Fig. 2496). See Liu Wentai (1982, p. 240).

³⁸⁹ *Saussurea lappa* Clarke; anon. (1977b, Fig. 0703), Hu Shiu-ying (1980, no 0897b); *Vladiminea denticulata* Ling.; anon. (1977b, Fig. 0703); *Vladiminea souliei* (Franch. Ling.; anon. (1977b, Fig. 0703), Hu Shiu-ying (1980, no 0897a). See Liu Wentai (1982, pp. 239–40).

³⁹⁰ *Dioscorea opposita* Thunb.; anon. (1977b, Fig. 0319), Hu Shiu-ying (1980, no 1199). See Liu Wentai (1982, p. 241).

‘ancient name: *shu yu*’ 署預; in the *Zheng lei ben cao*, this was the term that was retained for the entry, out of respect for the text of the *Shen nong ben cao jing*, but even then a note adds that ‘today it is called *shan yao*’. Finally, two drugs are added to the list of those that figure in the *Zheng lei ben cao*: *yi zhi zi* 益智子,³⁹¹ which is shifted from the trees section where it had been placed under the Song, and finally *cao guo* 草果,³⁹² which is ‘now added’. Overall, all the entries that figure in the upper grasses section of the *Zheng lei ben cao* are present in the *Ben cao pin hui jing yao*. And seven new entries are added: one as an original addition, four as a result of the subdivision of entries and two as a result of transfers, in the one case from the tree section and in the other from the intermediary rank of grasses.³⁹³

An analysis of each of these cases may make it possible to fathom further the classificatory choices made by the authors of the *Ben cao pin hui jing yao*. First, take the newly introduced *cao guo*: this is a multiannual herbaceous plant that grows in the southern provinces of China, the kernel (*ren* 仁) of which is used when extracted, by roasting over a gentle heat, from the seeds inside the fruit. Since this kernel is non-toxic, it is logically enough placed in the top class of grasses. As for the indigo dye, *qing dai* 靛, ³⁹⁴ a non-toxic drug, which was a novelty in the *Zheng lei ben cao*, this is transferred from the middle rank to the upper rank. *Alpinia oxyphylla*, *yi zhi zi*, also a novelty in the *Zheng lei ben cao*, and no doubt little known at that time, had been placed among the trees. However, the various descriptions cited, reproduced in particular from Su Song’s *Ben cao tu jing*, were already comparing its leaf to *rang he*, the mioga ginger,³⁹⁵ and its stem to bamboo. Likewise, the illustration provided (Fig. 7) looks more like a herbaceous plant than a tree. It was no doubt for all these reasons that the authors of the *Ben cao pin hui jing yao* moved this drug from the lower-ranking tree section, to the higher-ranking grasses section.

This inventory of alterations reflects the variety of the criteria taken into account when making classificatory choices and also shows that these choices tend essentially to specify or modify a classic model dating from close on four centuries earlier. These occasional interventions operate at many very different levels: raw/cooked, generic/specific, and the pharmaco-dynamic nature and category of the living plant.

As we know,³⁹⁶ this work, completed in 1505, was not to be published until 1937 and even then without the remarkable illustrations that accompanied the texts.

³⁹¹ *Alpinia oxyphylla* Miq.; anon. (1977b, Fig. 4017), Hu Shiu-ying (1980, no 0586).

³⁹² *Amomum tsao-ko* Crevost and Lem.; anon. (1977b, Fig. 3284), Hu Shiu-ying (1980, no 1700).

³⁹³ This refers to the indigo dye *qing dai*, 靛 (blue bag), obtained from various plants: *Baphicacanthus cusia* (Nees) Brem.; anon. (1977b, Fig. 2494), Hu Shiu-ying (1980, no 0222b); *Indigofera tinctoria* L.; anon. (1977b, Fig. 2494), Hu Shiu-ying (1980, no 0222c); *Isatis tinctoria* L.; anon. (1977b, Fig. 2494), Hu Shiu-ying (1980, no 0222d); *Isatis indigotica* Fort.; anon. (1977b, Fig. 2494); *Polygonum tinctorium* Ait. Anon. (1977b, Fig. 2494), Hu Shiu-ying (1980, no 0222a).

³⁹⁴ *Indigofera tinctoria* L. (Read 1936, p. 120).

³⁹⁵ *Zingiber mioga* Roscoe; Jia Zuzhang and Jia Zushan (1955, Fig. 1768); anon. (1977b, Fig. 5717).

³⁹⁶ See SCC Volume 6, Part 1, pp. 302–8, Okanishi Tameto (1977, p. 200), Unschuld (1986, p. 128).



Fig. 7. *Yi zhi zi* 益智子 (*Alpinia oxyphylla* Miq.). From *Zheng lei ben cao*, reproduction of the 1249 edition (*juan* 14, *mu bu xia pin* 木部下品) (cf the 1957 edition, p. 352).

It is hard to tell how much influence it may have had,³⁹⁷ given that the rare manuscripts of it were kept in the imperial library, so gaining access to them was certainly not easy.³⁹⁸ It nevertheless testifies to an original syncretism in the classification of drugs between the pharmacological model of the *Zheng lei ben cao* and the cosmological model proposed by Shao Yong. Now let us consider a text produced as a result of private initiative.

³⁹⁷ On its interest, recognised by Father d'Incarville, see p. 627 below.

³⁹⁸ On the complement produced in 1700, see p.100 below.

The Ben cao meng quan 本草蒙筌

The *Ben cao meng quan*,³⁹⁹ composed by Chen Jiamo 陳嘉謨 (1486–1600), was published in 1565, more than half a century after the previous manuscript had been delivered to the imperial library, where, we should remember, it remained. The Introduction, *fan li*, explains Chen Jiamo's method of classifying *materia medica*:

The number of the chapters (*juan*) and their order faithfully follow the model of the *Ji yao* 集要;⁴⁰⁰ [there is] first the grasses section, for the book is called *ben cao* and the simples are mostly made up of grasses, are they not? Next [comes] the trees section, a category in the *ben cao*; next the sections on seeds, vegetables and fruits: the remaining plants.⁴⁰¹

Next come the sections devoted to stones, animals and finally man, who is considered last because he is the wisest of all beings. The author then continues his description of the structure of the work:

The distribution of products among distinct sections,⁴⁰² which is very confused in the ancient texts, has been totally revised. All that grows upward, forming a trunk, is tree; that which does not form a trunk is grass. *Acanthopanax* (*wu jia pi* 五加皮),⁴⁰³ spindle (*wei mao* 衛矛),⁴⁰⁴ pepper (*hu jiao* 胡椒),⁴⁰⁵ giant hyssop (*huo xiang* 藿香),⁴⁰⁶ have a small and supple stem and do not form a trunk; they used to be placed in the trees section, today [I] move them to the grasses section. All that has leaves and roots that can be eaten [is placed under] vegetable (*cai*), otherwise in that of grass; fresh ginger (*sheng jiang* 生薑)⁴⁰⁷ that can be eaten used to be noted in the grasses section, but now [I] move it to the vegetables section. Shiso (*zi su* 紫蘇),⁴⁰⁸ Japanese catmint (*jing jie* 荊芥),⁴⁰⁹ corn mint (*bo he* 薄荷),⁴¹⁰ *Elsholtzia* (*xiang ru* 香薷),⁴¹¹ water pepper (*liao shi* 蓼實),⁴¹² hollyhock (*shu kui* 蜀葵),⁴¹³ are only used in a potion as remedies, one cannot consume them like vegetables; in the past they figured in the vegetables section, [but I] now move them [to] the grasses section. The seeds that can be eaten boiled are grains (*mi* 米);⁴¹⁴

³⁹⁹ For a description of this work, see Okanishi Tameto (1977, pp. 238–9) and Unschuld (1986, pp. 241–8). The page numbers refer the reader to the recent edition of the text by Wang Shumin, Chen Xiangping and Zhou Chaofan (Chen Jiamo 1988).

⁴⁰⁰ This is the *Ben cao ji yao* 本草集要 by Wang Lun 王綸, published in 1496. See Okanishi Tameto (1977, pp. 236–7), Unschuld (1986, pp. 119–20).

⁴⁰¹ See Chen Jiamo (1988, p. 13).

⁴⁰² My translation for *bu fen pin hui* 部分品彙.

⁴⁰³ *Acanthopanax* spp.; anon. (1977b, Fig. 767), *Eleutherococcus* spp. (= *Acanthopanax* spp.). Hu Shiu-ying (1980, no 1939).

⁴⁰⁴ *Euonymus alatus* (Thunb.) Sieb.; anon. (1977b, Fig. 3493).

⁴⁰⁵ *Piper nigrum* L.; anon. (1977b, Fig. 3218).

⁴⁰⁶ Certainly *Agastache rugosa* (Fisch. and Mey.) O. Ktze, or possibly *Pogostemon cablin* (Blanco) Benth., patchouli; anon. (1977b, Fig. 5685), Hu Shiu-ying (1980, no 0581).

⁴⁰⁷ *Zingiber officinale* Rosc.; anon. (1977b, Fig. 1358).

⁴⁰⁸ *Perilla frutescens* (L.) Britt.; anon. (1977b, Fig. 1424).

⁴⁰⁹ *Schizonepeta tenuifolia* (Benth.) Briq.; anon. (1977b, Fig. 3246), = *Nepeta japonica* Maxim.; Jia Zuzhang and Jia

Zushan (1955, Fig. 0342).

⁴¹⁰ *Mentha arvensis* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0337).

⁴¹¹ *Elsholtzia splendens* Nakai ex F. Mackawa; several species of *Elsholtzia* are also used under the same Chinese name in various regions of China, see anon. (1977b, Fig. 0326).

⁴¹² *Polygonum hydropiper* L.; anon. (1977b, Fig. 5317 and 1057).

⁴¹³ *Althaea rosea* (L.) Cav.; anon. (1977b, Fig. 5180).

⁴¹⁴ I am translating as 'grains' the Chinese term *mi*, which more precisely designates the state that follows hulling and precedes the cooking of most edible grains. Chinese, like most East Asian languages, has a series of distinct terms to designate the various stages in the development and preparation of cereals. Here is an example of the variety of the contemporary vocabulary for rice, which today forms the basis of edible foods: *yang* 秧 for a shoot

the seeds of the poppy⁴¹⁵ have a sweet taste and are tonic; under the name ‘grain for the emperor’ (*yu mi* 御米), they used to figure in the grasses section, [but I] now move them [to the] grains section. The fructifications that can be consumed raw are fruits; the galangal⁴¹⁶ has a sharp taste, it cannot generally be used as a fruit; it used to figure [in the] fruits section, [but I] now move it [to the] grasses section. The lungan,⁴¹⁷ the Japanese plum,⁴¹⁸ the nutmeg tree⁴¹⁹ all belong to the category of fruit trees; one could almost place them in the trees section, but [I] move them [to the] fruits section.⁴²⁰

Further on the author again explains:

Although those [drugs], identical ones with different names, different ones with the same name, or different ones with different names but having the same therapeutic properties, used to be separated in earlier texts, we now group them all in an annexe following each entry.⁴²¹

To sum up, the five chapters concerning products of plant origin are grouped together following the order already found in Wang Lun’s *Ben cao ji yao*,⁴²² and this arrangement is justified by arguments founded on the intrinsic importance – as *materia medica* – of the plants that figure in the various chapters. As for the reason for placing the drugs in such or such a section, we can see from the text above that, for Chen Jiamo, the botanical characteristics of plants that produce *materia medica* are less decisive as criteria of classification than is their usage. The fact of figuring as the principal entry for a name, which is indicated by it being noted in large characters in the summary of the work, confers a generic value upon a plant, and the possible sub-categories then appear in the text under each such name. For example, in the first grasses section, under the rubric *tu si zi* 莠絲子 (dodder),⁴²³ two kinds are named, the one delicate and yellow, called *chi gang* 赤綱, ‘red net’, and the other one larger and light-coloured, called *tu lei* 莠藎, ‘dodder-bramble’; the text notes that ‘although there are two kinds (*zhong lei*), their effects are identical’.⁴²⁴ As we can see, the author’s major concern is clearly therapeutic and the arrangement of the drugs that he chooses is definitely influenced by that assumption.

that is replanted; *dao* 稻 for a growing plant, a paddy; *gu* 穀 for the seed after being uprooted; *mi* 米 for the seed after hulling; *fan* 飯 for the seed when steamed or cooked in water in such a way that the grains remain firm and separate; *zhou* 粥 for boiled rice. As can be seen in this particular case, seeds produced by plants other than graminaceous ones may be classified in the same section, being assimilated to the latter on account of their analogous uses: not only poppy seeds, but also the seeds of various leguminous plants. However, the latter are not designated by *mi* but by *dou* 豆, which is the generic term for the seeds of leguminous plants.

⁴¹⁵ *Ting su* 罌粟, *Papaver somniferum* L.; anon. (1977b, Fig. 5342).

⁴¹⁶ *Cao dou kou* 草豆蔻, *Alpinia katsumadai* Hayata; anon. (1977b, Fig. 3291).

⁴¹⁷ *Long yan* 龍眼, *Euphoria longan* (Lour.) Steud.; anon. (1977b, Fig. 1300).

⁴¹⁸ *Yu li* 郁李, *Prunus japonica* Thunb.; anon. (1977b, Fig. 2709).

⁴¹⁹ *Fei tui* *Torreya grandis* Fort.; anon. (1977b, Fig. 5273).

⁴²⁰ See Chen Jiamo (1988, pp. 13–14), English version of author’s French translation.

⁴²¹ See Chen Jiamo (1988, p. 14), English version of author’s French translation.

⁴²² The author’s preface is dated 1492; see Okanishi Tameto (1977, pp. 236–7).

⁴²³ This term is today identified with *Cuscuta japonica* Choisy; Jia Zuzhang and Jia Zushan (1955, Fig. 227). In the context of the *Ben cao meng quan*, it should certainly be considered to have the generic sense of *Cuscuta*. One flora (anon. 1972–6, Volume 3, pp. 521–3) describes five species of cuscuteae that are present in China. According to this source, *chi gang* could be identified with *C. chinensis* Lam, and *tu lei* with *C. europea* L.

⁴²⁴ Chen Jiamo (1988, p. 45).

The naturalist aspect is, however, not neglected on that account but it does figure at a lower level. It is noticeable that the classificatory choices are based, depending on the categories, on natural criteria for differentiating trees and herbs, but on usage criteria for the other three categories. Perhaps the author was in this way indicating that he had noticed an essential implicit difference between, on the one hand, trees and grasses, which are categories of wild plant, and, on the other, the three that all concern only cultivated plants.

The Tai yi xian zhi ben cao yao xing da quan 太乙仙制本草藥性大全

The *Tai yi xian zhi ben cao yao xing da quan* (Compendium on the Nature of the *Materia Medica* of the Spirits of the Supreme Summit), completed by Wang Wenjie 王文洁 between 1565 and 1582,⁴²⁵ presents a classification of *materia medica* that likewise seems influenced by the choice made in the *Ben cao ji yao*. The plants as a whole are regrouped at the beginning of this work. An important section devoted to grasses – *Cao bu shang*, *juan* 1, and *Cao bu xia*, *juan* 2 – is followed by sections devoted to trees, *Mu bu*, *juan* 3; to fruits, *Guo bu*, *juan* 4, pp. 1a–25b; to grains, *Mi gu*, *juan* 4, pp. 26a–49b; to vegetables, *Cai bu*, *juan* 5, pp. 1a–25b. Next come the sections *Ren bu* 人部, ‘human [products]’, *juan* 5, pp. 26a–36a; *Jin yu bu* 金玉部, ‘precious metals and jades’, *juan* 6, pp. 1a–53b; *Tu shui bu* 土水部, ‘earths and waters’, *juan* 6, pp. 54a–64b; *Shou bu* 獸部, ‘beasts’, *juan* 6, pp. [1a]–42b; *Qin bu* 禽部, ‘winged’, *juan* 7, pp. 43a–54a; *Chong bu* 蟲部, ‘insects’, *juan* 8, pp. 1a–38b; *Yu bu* 魚部, ‘fish’, *juan* 8, pp. 39a–47b. There are no other subdivisions in these main categories.

The Ben cao gang mu 本草綱目

We now come to the 16th-century work that was the most widely available, the *Ben cao gang mu* (Classified *Materia Medica*), the manuscript of which was completed by Li Shizhen 李時珍 (1518–93) in 1578 and the text of which was finally published by his descendants in 1596. The preface by Wang Shizhen 王世貞 (1516–90) is dated 1590. Li Shizhen’s first concern was clearly to make it possible for those using his work to treat people correctly. In his preface he deplores the dangers that are created by the imprecision that rules among most doctors when it comes to knowing how toxic drugs are likely to be. Indeed, the first classification of plants that we encounter in the *Ben cao gang mu* (*juan* 3 and 4) is based on the illnesses that they treat. Beneath the names of each illness or pathological symptom there is a list of the drugs likely to be used for therapeutic purposes that are cited in the main body of the work.⁴²⁶ The major part of this voluminous text (*juan* 5 to 52) lists the *materia medica*

⁴²⁵ Zheng Jinsheng (2001).

⁴²⁶ An analogous classification appears in Chapters 7 and 8 of Wang Lun’s *Ben cao ji yao*. All the *materia medica* is classified under twelve rubrics (*men* 門) that correspond to their therapeutic destination: ‘treats the *qi* (*zhi qi* 治氣), treats the cold (*zhi han* 治寒), treats the blood (*zhi xue* 治血), treats the heat (*zhi re* 治熱), treats congestion (*zhi tan* 治痰), treats the wet (*zhi shi* 治濕), treats the wind (*zhi feng* 治風), treats the dry (*zhi zao* 治燥), treats ulcers (*zhi chuang* 治瘡), treats poisons (*zhu du* 治毒), women (*fu ren* 婦人), children (*xiao er* 小兒)’. See Long Bojian (1957, p. 42).

individually according to a ‘reasoned classification’ (*gang mu* 綱目⁴²⁷) that the author describes in his preface, *fan li*, as follows:

My overall system of classification consists of sixteen sections (*bu* 部) that form the upper level (*gang* 綱) and sixty categories (*lei* 類) that form the lower level (*mu* 目), and everything is placed following [its category] ... In ancient works, jade, stone, water and earth are intermingled. The insects, animals with scales and animals with shells are not differentiated; or sometimes the insects fall into the trees section or the trees fall into the grasses section. Now I have put everything in order (*lie* 列) in sections beginning with waters and fires, followed by earth: for water and fire precede everything and earth is the mother of everything. Next come metals and stones for they issue from the earth. Next [I classify into] grasses, grains, vegetables, fruits, trees, proceeding from the smallest to the greatest.⁴²⁸ Next come clothing and objects made from plants.⁴²⁹ Then I work up from insects, animals with scales, animals with shells, winged animals and beasts to man, from the lowliest to the most precious.⁴³⁰

In contrast to the division of plants into five categories that is found in Tao Hongjing’s *Shen nong ben cao jing ji zhu* in the 6th century, and which we have regularly found in later *ben cao* – in the following order: grass, trees, fruits, cereals, vegetables – the originality of Li Shizhen lies in the hierarchy that he proposes. Once these major principles are laid down, he continues as follows:

Under the Tang and the Song, products were added: sometimes a thing figures three times, sometimes two or three things are confused. So, on the basis of research into the ‘correction of terms’,⁴³¹ I have separated or regrouped them but first I define the principal entries (*gang*) beneath which the lesser entries (*mu*) are annexed. If, for example, ‘dragon’ is defined as a principal entry, ‘tooth, horn, bone, brain, foetus, saliva’ are all arranged as secondary entries. Since ‘foxtail millet’⁴³² is defined as a principal entry, ‘grains of red millet’ and ‘grains of yellow millet’ are all secondary entries.

Drawing attention to the richness and complexity of the existing nomenclature, he goes on as follows:

Drugs (*yao*) possess numerous names that today differ from those of the past. However, it is the correct name (*zheng ming*) that defines (*biao* 表) the principal entry (*gang*), all the other names being placed under [the rubric] ‘Explanation of Names’ (*shi ming* 釋名). The correct name comes first. A commentary mentions the nomenclature [used] in each *ben cao* and also the sources of the citations.

⁴²⁷ The explicit reference to the title of the historical collection *Tong jian gang mu* completed by Zhu Xi 朱熹 (*SCC* Volume 6, Part 1, p. 315) reminds one also of the presence of the word ‘history’ in most of the titles of ancient works devoted to plants in the West.

⁴²⁸ For a summary table of the major sections of the various *ben cao*, see Chen Jiarui (1978).

⁴²⁹ Already at this stage, it is noticeable that the author intermingles natural objects and artefacts.

⁴³⁰ See Li Shizhen (1975–81, Volume 1, p. 33). The bibliographical references are to this edition.

⁴³¹ *Zheng ming* 正名. In this way, the doctor and pharmacologist clearly indicates that he belongs to the Confucian philological tradition; ‘correction of terms’ here should be understood as an attempt to equate the names found in ancient pharmacopoeia or other texts with existing objects.

⁴³² *Liang* 梁, *Setaria italica* (L.) Beauv.

Li Shizhen calls plants *cao mu* 草木 ('grass-tree') generally and more rarely *zhi wu* 植物 ('planted thing').⁴³³ The first of the five sections devoted to plants is about grasses (*cao*). Here is what he says in his introduction:

Heaven creates, Earth transforms and thus plants are born. The Rigid mingles with the Supple and in this way roots and bulbs are created; the Supple mingles with the Rigid and in this way branches and trunks are produced. Leaves and sepals depend on *yang*, flowers and fruits depend on *yin*. So in the grass there is the tree and in the tree there is the grass. That which receives the purity of *qi* is beneficial, that which receives the taint of *qi* is toxic. That is why there are the Five forms (*wu xing* 五形), Metal, Wood, Water, Fire, Earth; the Five Odours (*wu qi* 五氣), perfumed, stinking, of urine, of fish, of goat; the Five Colours (*wu se* 五色), dark green,⁴³⁴ red, yellow, white, black; the Five Tastes (*wu wei* 五味), acid, sour, sweet, spicy, salty; the Five Natures (*wu xing* 五性), cold, hot, warm, cool, neutral; the Five Uses (*wu yong* 五用), rising, falling, floating, sinking, mediating ... In this way, cutting into the complexity, chasing out the redundant, controlling errors, making up for lacks, separating the tribes (*zu* 族), sharing out the categories (*lei* 類), I establish my classification. Setting aside cereals and vegetables, there are 611 kinds (*zhong* 種) that can be used as medicinal plants and that belong to the grasses section (*cao bu*), which I divide into ten categories (*lei*):⁴³⁵ of the mountain, fragrant, of humidity, toxic, rampant, aquatic, of stone, mosses and lichens,⁴³⁶ diverse, named but not used.⁴³⁷

So it seems that *cao*, which in everyday language designates grass, in the *Ben cao gang mu* takes on two particular meanings: first, it refers to the whole group of plants with stems that are herbaceous or supple, as opposed to the group of plants that are ligneous or woody and are called *mu*. Second, it is the title of one of the five basic sections between which the plants are distributed in this book. In the latter case, it designates herbaceous plants that are essentially medicinal rather than simply foodstuffs, for the latter are grouped together in the sections of 'grains' (*gu*), 'vegetables' (*cai*) and, partially, fruits (*guo*), according to the criteria that Li Shizhen indicates in the introductions to each of the sections concerned. For the 'grains' (*gu*) he writes, 'In the section for grains, I have grouped together the fruits of grasses the seeds of which can be eaten; there are seventy-three kinds of these, divided into four groups that are hemp-barley-rice,⁴³⁸ millets, soya beans, and fermented products.'

⁴³³ As we can see, this term, which is now the only one used in the modern period to mean 'plant', and which appears already in the *Zhou li* (see p. 35 above), was not yet definitively accepted in the 16th century.

⁴³⁴ Actually, *qing* 青 covers a field that stretches from black to blue-green, the colour of the foliage of resinous plants and of the water of lakes.

⁴³⁵ In truth, eleven parts make up the main body of this section, for the mountain grasses are divided into two, as is the category of grasses of damp places, while the last two parts of 'various' plants and those that are 'named but not used' are merged into one. All the sections of the work are thus first subdivided into parts and are designated simply by a numerical order: 'the first of the grasses' (*cao zhi yi* 草之一), 'the fifth of the fruits' (*guo zhi wu* 果之五), etc. With very few exceptions, all these parts correspond to one category and one *juan* in the book.

⁴³⁶ The term *tai* 苔, which today designates more specifically the mosses, in Li Shizhen covers other inferior plants such as lichens.

⁴³⁷ Li Shizhen (1975–81, Volume 2, p. 687).

⁴³⁸ These terms should be taken to be generic; *mai* 麥, translated as 'barley', is frequently found as a basic term in the nomenclature of cereals other than rice and the millets.

The introduction to the ‘vegetables section’ (*cai bu*) states, ⁴³⁹

All the plants that provide nourishment are called vegetables (*cai*)⁴³⁹ ... So I have selected the grasses that provide nourishment, 105 kinds in all, to make the vegetables section (*cai bu*) divided into five categories, the odorous-spicy [condimentary], the supple-slippery [with mucilaginous leaves], the gourd vegetables,⁴⁴⁰ the aquatic and the mushrooms.

The next section, which is devoted to fruits, is introduced as follows:

The fruits (*shi* 實) of trees are called *guo*, those of grasses are called *luo*. When ripe they can be eaten, when dried, they can be preserved, set aside in times of plenty, they can save lives when times are hard and they can provide medicaments in cases of illness. They complete the nourishment from grains in order to feed the people ... I have thus grouped together the fruits of plants called *guo* and *luo* in the section for fruits (*guo bu*), which contains 127 kinds. I have divided them into six categories which are five fruits,⁴⁴¹ fruits of the mountain, exotic fruits, tasty fruits, gourd-fruits (*luo*)⁴⁴² and aquatic fruits.

The last section devoted to plants is that on trees. This is how Li Shizhen presents it:⁴⁴³

mu [tree/wood] is a plant (*zhi wu*) and one of the Five Phases. Its nature is determined by the soil: mountains, valleys, plains, marshes. At first it is through the transformation of *qi* that it receives nature and form: upright (*qiao* 喬), with hanging leaves (*tiao* 條), in a clump (*bao* 苞), in a thicket (*guan* 灌); root, leaf, flower, fruit, solidity, fragility, beauty, ugliness, all depend on the Supreme Summit (*Tai ji* 太極). Colour, perfume, *qi*, and taste make it possible to distinguish kinds (*zhong*) and categories (*lei*). As a foodstuff, it provides fruits and vegetables; as material, it provides medicaments and objects ... Finally, deploying great energy in tracking down documentation, I have classified this whole group. It is the trees section (*mu bu*), made up of 180 kinds divided into six categories, which are odorous trees, upright, bushy, epiphyte, in clumps and the category of assorted woods.

If we compare this with the abundant list of types of tree in the *Er ya*,⁴⁴⁴ we notice that Li Shizhen has retained only four kinds of the ‘nature’ of the trees. It is interesting to note that two of those ‘natures’ are still used today in the keys for

⁴³⁹ Li Shizhen here implicitly takes over the functional definition found in the *Su wen*: ‘the five grains nourish; the five vegetables complement’. In this way, even in today’s Chinese cuisine, the two fundamental categories are marked out, distinguishing between, on the one hand, *fan*, 飯, or *zhu shi*, 主食, the basic foodstuffs consisting of ‘grains’, and, on the other, *cai*, 菜 or *fu shi*, 副食, secondary foodstuffs that make up the dishes that accompany the former. See Chang Kuang Chih (1977b, pp. 7 ff., 39 ff.).

⁴⁴⁰ *Luo* 蘿, defined by Li Shizhen as ‘the fruiting of grasses’, refers more precisely to marrows and also to other fruits the form of which is reminiscent of that of marrows, such as the aubergine. Hence my translation ‘gourd vegetable’ in this context, for *luo cai*. In the case of the fruits section, the *luo* category is also to be found: it includes melon, watermelon, cultivated and wild grapes, actinidia, sugarcane, raw and refined sugars, and manna. This seems to me to confirm both the functional aspect of the classification system and also the implicit inclusion among the ‘grasses’ of lianas such as vines and actinidia, even though these have woody stems, alongside large graminaceous plants with rigid stems such as sugarcane. This puts one in mind of Li Shizhen’s words in his introduction to the grasses section: ‘in the grass there is the tree, in the tree there is the grass’.

⁴⁴¹ This expression designates the principal fruits cultivated in northern China: this section contains eleven entries: a plum tree, *li* 李 (*Prunus salicina* Lindl.); the Japanese apricot tree, *mei* 梅 (*Prunus mume* Sieb. et Zucc.); the apricot tree, *xing* 杏 (*Prunus armeniaca* L.); the almond tree, *ba dan xing* 巴旦杏 (*Prunus amygdalus* L. Stokes); the peach tree, *tao* 桃 (*Prunus persica* (L.) Batsch); the sweet chestnut tree, *li* 栗 (*Castanea mollissima* Bl.); a horse chestnut tree, *tian shi* 天師栗 (*Aesculus chinensis* Bge.); and three varieties of jujube tree, *zao* 棗 (*Zizyphus jujuba* Mill.).

⁴⁴² See note 440 above.

⁴⁴³ See Li Shizhen (1975–81, Volume 2, p. 1911).

⁴⁴⁴ See p. 49 above.

determining floras. This is clearly for reasons of convenience, even if they do not play a determining role in the taxonomic systems of modern botany. The modern terms are quite close to Li Shizhen's terminology: *qiao mu* 喬木, tree (Latin: *arbor*), and *guan mu* 灌木, shrub (Latin: *frutex*).⁴⁴⁵

In each of the categories, *lei*, defined by Li Shizhen within the sections, particular rubrics are devoted to each kind, *zhong*. It is at this level that the plants and products that are taken into consideration are provided with information that refers to the two other well-known classificatory systems: the one pharmaco-dynamic, that of the 'three ranks' (*san pin*), the other cosmological, that of the 'Five Phases'⁴⁴⁶ (*wu xing*). Only the plants – or products of plant origin – that are of dietetic and/or medicinal interest⁴⁴⁷ are taken into account in the *Ben cao gang mu*.⁴⁴⁸ Again, two fundamental categories correspond to herbaceous plants and ligneous plants. The former, which are the more numerous (789 entries), are implicitly subdivided into wild plants and cultivated ones. The cultivated plants are then divided into staple grains and vegetables. Upon studying the various subdivisions within the five major sections, one realises that the plants within those subdivisions range from one to several dozen, so it is relatively easy for a specialist to find whatever information he is looking for.⁴⁴⁹

The system for classifying the plants is based on criteria that stem from a number of different domains. The five sections (*bu*) are defined by the nature of the stem (herbaceous or ligneous), by whether the plant is wild or cultivated, by whether it is a foodstuff or medicinal *stricto sensu*, and finally by the part of the plant that is consumed if it is a foodstuff. For the categories (*lei*) of the subsidiary level, sometimes the determining factor is the plant's characteristics: its ecology, its organoleptic nature, its geographical origin, the part of it that is consumed, its remarkable properties

⁴⁴⁵ Wang Fuxiong and Hu Yuxi (1982, pp. 123 and 75).

⁴⁴⁶ For a general presentation, see Granet (1934, pp. 360 f.); *SCC* Volume 2, pp. 274 f.; Kalinowski (1991).

⁴⁴⁷ The ancient system of the three grades or ranks makes it possible to integrate with the medicinal plants the whole group of foodstuff plants, most of which belong to the upper rank and are described as 'nourishing life' without their prolonged use leading to harmful secondary effects.

⁴⁴⁸ China possesses one of the richest floras in the world, roughly 25,000 species of upper-rank plants to which should be added several thousands of mosses, mushrooms and brackens. When compared to this, the 1,096 entries concerning plants in the *Ben cao gang mu* show clearly that Li Shizhen draws up an inventory of only a small section of the plants to be found in nature or cultivated in China. But in any case, his work has no pretensions to constituting a flora that seeks to list all the plants that grow in a region or to provide a key to their identification on the basis of formal criteria, as a modern flora would. His work is first and foremost a pharmacological treatise. Notable, in particular, is the fact that in the category of 'plants named but not used', where these are presented by name and are cited in the chronological order in which they are mentioned in works from the *Shen nong ben cao jing* right down to the *Ben cao gang mu*, Li Shizhen contributes, for each of the thirty-eight plants that he mentions, no more than information concerning their posology and pharmacological preparation, whereas for most of the entries in other categories the references cited provide, alongside indications of their medicinal uses, details about their taste, geographical origin and ecology, as well as the bearing of the plant.

⁴⁴⁹ This way of dividing things up no doubt also made it possible to learn more easily from those who knew about things to do with fields and nature as, already under the Song, Zheng Qiao, in his introduction to his *Essay on Animals and Plants*, urged the literati to do, in order to be able to study the plants and animals cited in the canonical texts. It seems that Li Shizhen did engage in studies of the terrain as well as in his bibliographical researches in the course of the long years that he devoted to producing his book. See, for example, Qian Yuanming (1984, p. 3). Nevertheless, if one systematically analyses the contents of the rubrics of the *Ben cao gang mu*, one is struck by the volume of citations of texts compared to that of the fruits of the direct experience of the author. See Métailié (2001a, pp. 250–5).

(toxicity, perfume) or its habit (that of a liana, upright, shrubby); sometimes the determining factor is the type of plant that it is (moss/lichen, mushroom, epiphyte). The last category in the grains section even concerns fermented products, while in the trees section, the category 'various woods' is concerned solely with planks of different kinds. We are faced here with a heterogeneous and practical system the purpose of which is not to facilitate an unambiguous identification of an unknown plant found in nature, but rather to make it possible to recognise a thousand plants and plant products in order to gain information that will make it easier to use them correctly in medical practice. However, when reading the *Ben cao gang mu*, a botanist is surprised to find that the names of certain plants, today classed in the same botanical family, are also there to be found collected into the same category. And indeed, if one chooses to examine, in the *Ben cao gang mu*, the distribution of plants belonging to some of the 'natural' groupings⁴⁵⁰ that have been recognised in the West for a very long time – but that were not named in China until the end of the 19th century, when Western botanical knowledge was introduced there⁴⁵¹ – one notices that the rubrics concerning seven crucifers (Brassicaceae)⁴⁵² mentioned in the odorous-spicy category of the vegetables section are all cited one after another in the text. Of the Lamiaceae, eleven are to be found again in the grasses section, in the category of odorous grasses.⁴⁵³ Another example is provided by the umbellifers (Apiaceae). The twenty-seven species identified by Read are distributed among ten categories. In seven of those categories they are represented by a single species, but they form three homogeneous groups of six species in the vegetables section, in the odorous-spicy category, and of seven species in the grasses section, respectively in the category of perfumed grasses and in that of mountain grasses. This last case is particularly interesting, for an Araliaceae is slipped in among the seven mountain umbellifers. Now, the families of the Umbelliferae and the Araliaceae belong to the same order of Umbellales in the modern system and 'the Araliaceae must be very close to certain Umbelliferae'.⁴⁵⁴ In this case, the traditional Chinese nomenclature reflects a recognition of such a resemblance, for the name of an umbellifer, *dang gui* 當歸, the Chinese angelica,⁴⁵⁵ serves as the basis of the name of this Araliaceae, *tu dang gui* 土當歸,⁴⁵⁶ the literal meaning of which is 'the angelica of the earth' (Fig. 8a, b). Other groupings of plants in Li Shizhen partially cover other

⁴⁵⁰ 'Natural' should, of course, be understood in a relative sense. A. L. de Jussieu is recognised to have been the first to apply the methods of the natural classification of plants according to the procedure indicated by John Ray. De Jussieu demonstrated the principle of the subordination of characteristics, which consists in founding the primary divisions upon characteristics produced by the presence or absence of the least variable organs. For the establishment of subsidiary groups of increasingly low-grade characteristics – that is to say, based on the presence or the form of organs that are less and less stable and more and more variable – see Germain de Saint-Pierre (1870, p. 879). In this way, plants belonging to the same botanical family in general share visible features that are sufficiently striking for this group to be considered to be 'in conformity with nature'. In truth, such systems that are implicitly based on the constancy and immortality of species are just as artificial, and certain authors, such as Lorch (1977), consider that, for taxonomic systems, the very notion of 'natural' should be banished.

⁴⁵¹ See Métaillé (1981), Luo Guihuan (1987). ⁴⁵² Out of the twelve noted by Read (1936, pp. 145–50).

⁴⁵³ That is to say, half of those cited in the *Ben cao gang mu*, according to Read (1936, pp. 30–6), the rest being divided among mountain grasses (one), water grasses (four and two) and creeping grasses (one).

⁴⁵⁴ Crété (1965, p. 303). ⁴⁵⁵ *Angelica sinensis* (Oliv.) Diels; anon. (1977b, Fig. 1763).

⁴⁵⁶ *Aralia cordata* Thunb.; anon. (1977b, Fig. 0154).

botanical families, such as the Euphorbiaceae, the Compositae (Asteraceae) and also the Araceae.⁴⁵⁷ It seems that these groups, not expressly named, may be considered, from an ethnobiological point of view, 'covert categories'⁴⁵⁸ or 'submerged families'.⁴⁵⁹ Nevertheless, the logic that governs the organisation of a botanical family is not the same as that which underpins a covert category, and in this respect the case of the Compositae is interesting. Of the fifty plants identified as belonging to this family,⁴⁶⁰ thirty-four appear in the category of damp grasses (*xi cao lei* 隰草類). This category is subdivided into two groups: the first part, *xi cao lei shang*, which forms *juan* 15, and the second part, *xi cao lei xia*, *juan* 16. The first part contains fifty-three entries and the names of twenty-five of them have been identified as referring to Compositae. Given that, in a case in which a sub-group of forty-five plants starts off with ten Compositae and ends with four more, I suggest, as a hypothesis, that these plants, together with plants from other botanical families that intermingle with them, may form a covert category. On the basis of the information provided by the text of the *Ben cao gang mu*, whether originating from Li Shizhen or from other authors that he cites, I shall now seek indications that make it possible to understand the supplementary reasons that may have persuaded Li Shizhen to regroup these plants: the first reason is their habitat: they grow in damp places. I shall list them in the order in which they appear in the text.

The first two are two chrysanthemums, *ju* 菊⁴⁶¹ and *ye ju* 野菊,⁴⁶² the first smells strongly of artemisia, *hao ai qi* 蒿艾氣; the stem of the second resembles that of the *ma lan* 馬蘭,⁴⁶³ the purple chrysanthemum, and its flower resembles that of the *ju*. Li Shizhen tells us that the next plant, *yan lü* 庵藺,⁴⁶⁴ belongs to the category of artemisia *hao* 蒿, and that its leaf resembles not that of the artemisia *ai* 艾 but that of a thinner version of the chrysanthemum *ju* 菊. The next, the achillea, *shi* 蓍,⁴⁶⁵ also belongs to the category of the *hao*.⁴⁶⁶ The next entry concerns the artemisia used for moxa, *ai* 艾,⁴⁶⁷ the shape of whose leaf is similar to that of the artemisia *hao*. The next plant cited is one that Li Shizhen has introduced into the pharmacopoeia: *qian nian ai* 千年艾. This 'thousand-year-old artemisia', the botanical identification of which is doubtful,⁴⁶⁸ has a root that resembles that of the artemisia *peng hao* 蓬蒿,⁴⁶⁹ yellow flowers that resemble those of the chrysanthemum *ye ju* and leaves

⁴⁵⁷ Needham (1971), Chen Jiarui (1978).

⁴⁵⁸ On the notion of 'covert categories', see in particular Berlin, Bredlove and Raven (1968), the discussion in Atran (1990, pp. 41–6), Berlin (1992, pp. 176–81), Ellen (1993, pp. 119–21).

⁴⁵⁹ Needham (1971, p. 130). See also SCC Volume 6, Part 1, note c, p. 177. ⁴⁶⁰ Read (1936, pp. 1–12).

⁴⁶¹ *Chrysanthemum sinense* Sab.; Jia Zuzhang and Jia Zushan (1955, Fig. 0052).

⁴⁶² *Chrysanthemum indicum* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0053).

⁴⁶³ *Kalimeris indica* (L.) Schulz-Bip. (= *Aster indicus* L.); anon. (1977b, Fig. 0578).

⁴⁶⁴ *Artemisia keiskeana* Miq.; Jia Zuzhang and Jia Zushan (1955, Fig. 0019).

⁴⁶⁵ *Achillea sibirica* Ledeb.; Jia Zuzhang and Jia Zushan (1955, Fig. 0001).

⁴⁶⁶ *Shi nai hao shu* 蓍乃蒿屬; see Li Shizhen (1975–81, p. 934).

⁴⁶⁷ *Artemisia argyi* Lévl. et Vant.; anon. (1977b, Fig. 1175).

⁴⁶⁸ Gao Minggan (2006, p. 28) identifies the name, according to the *Zhi wu ming shi tu kao*, with *Monochasma savatieri* Franchet, but certain morphological details (the colour of pink flowers, the absence of down on the leaves) do not agree with the description given by Li Shizhen. No doubt this is a case of homonymy.

⁴⁶⁹ *Artemisia sieversiana* Erh. ex Willd.; anon. (1977b, Fig. 1392).

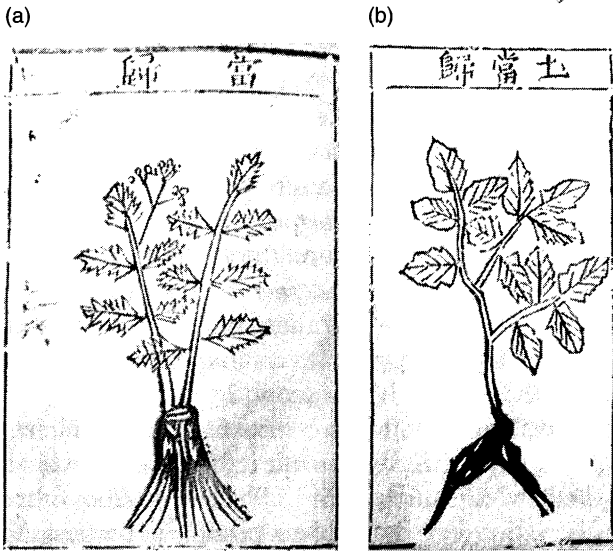


Fig. 8 (a) *Dang gui* 當歸 (*Angelica sinensis* (Oliv.) Diels.), from *Ben cao gang mu* (1596, *fu tu juan zhi shang* 附圖卷之上, 草部芳草類附圖, 15a), cf Li Shizhen (1975–81, Volume 2, *fu tu* p. 25); (b) *Tu dang gui* 土當歸 (*Aralia cordata* Thunb.), from *Ben cao gang mu* (1596 edn 附圖卷之上, 草部山草類附圖, 12a). Cf Li Shizhen (1975–81, Volume 2, *fu tu* p. 23).

which, although unlike those of the artemisia *ai*, do have their smell. The next seven plants are all *hao*, respectively *yin chen hao* 茵陳蒿,⁴⁷⁰ *qing hao* 青蒿,⁴⁷¹ ‘dark green *hao*’ which, according to a note in the *Er ya*, taken over by Li Shizhen, ‘is the only one of all the artemisias that can [also] be named simply *hao*’;⁴⁷² *huang hua hao* 黃花蒿,⁴⁷³ ‘*hao* with a yellow flower’ or ‘stinking’, which differs from the preceding plant only in that it has a bad smell; *bai hao* 白蒿,⁴⁷⁴ ‘white *hao*’; *jiao hao* 角蒿,⁴⁷⁵ ‘horned *hao*’ (Bignoniaceae); and *lin hao* 蘼蒿, the identification of which is doubtful,⁴⁷⁶ but which is said by Li Shizhen to resemble the ‘small thistle’ *xiao ji* 小薊. The next plant, *ma xian hao* 馬先蒿,⁴⁷⁷ is a Scrophulariaceae ‘with the smell of *hao* artemisia, like horse’s dung’. The next plant, *yin di jue* 陰地蕨,⁴⁷⁸ is a fern, ‘the leaves of which resemble [those of] dark green artemisia (*qing hao*)’. Next comes the male artemisia, *mu hao* 牡蒿,⁴⁷⁹ so

⁴⁷⁰ *Artemisia capillaris* Thunb.; Jia Zuzhang and Jia Zushan (1955, Fig. 0014).

⁴⁷¹ *Artemisia apiaceae* Hance; Jia Zuzhang and Jia Zushan (1955, Fig. 0013).

⁴⁷² Li Shizhen (1975–81, Volume 2, p. 943).

⁴⁷³ *Artemisia annua* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0012).

⁴⁷⁴ *Artemisia sieversiana* Ehrh. ex Willd.; anon. (1977b, Fig. 1392).

⁴⁷⁵ *Incarvillea sinensis* Lam.; anon. (1977b, Fig. 2343).

⁴⁷⁶ Read (1936, no 104) considers this plant to be one of the Scrophulariaceae, *Pedicularis gloriosa* Biss. and Mre.

⁴⁷⁷ *Pedicularis resupinata* L. Read (1936, no 105).

⁴⁷⁸ *Botrychium ternatum* Sw., Read (1936, no 801). *Japonobotrychium virginianum* (L.) Nishida, in Kitamura Shiro (1986, p. 194).

⁴⁷⁹ *Artemisia japonica* Thunb.; Jia Zuzhang and Jia Zushan (1955, Fig. 0015).

called because it is 'the only artemisia that carries no seeds'.⁴⁸⁰ The leaf of the next plant, *jiu niu cao* 九牛草,⁴⁸¹ 'resembles the leaf of the *ai*'. Next, it is another of the Labiatae that is cited, *chong wei* 茺蔚,⁴⁸² for which Li Shizhen notes that 'in the spring when it begins to grow, its shoot resembles a young artemisia (*hao*)'.⁴⁸³ Then comes yet another Labiatae of the same genus, *zan cai* 鑿菜,⁴⁸⁴ which differs only in the colour of its flowers. *Wei xian* 薇銜,⁴⁸⁵ the next plant cited, 'resembles *chong wei*'. For a self-heal, *xia ku cao* 夏枯草,⁴⁸⁶ which is a Labiatae, Li Shizhen mentions no analogy with any other plant of the group. As for the next plant, *liu ji nu cao* 劉寄奴草,⁴⁸⁷ according to Li Shizhen, although its leaf does not resemble that of an artemisia, its flowers do resemble those of a small chrysanthemum. The pappus⁴⁸⁸ of the flowers and also the fruits resemble those of the sow thistle,⁴⁸⁹ *ku mai* 苦蕒. The *qu jie cao* 曲節草⁴⁹⁰ has a leaf similar to that of the *liu ji nu cao* but softer and of a darker green. *Li chun cao* 麗春草, the poppy (Papaveraceae),⁴⁹¹ cannot be attached to the implicit group of the Compositae except through one of the synonyms that is cited from the *Ben cao tu jing* of the Song, *xian nü hao* 仙女蒿, 'the artemisia of the goddesses'. On the subject of *xuan fu hua* 旋覆花,⁴⁹² elecampane, which is next to be cited, Li Shizhen, considering the leaf, repeats the remarks of Kou Zongshi 寇宗奭, the author of the *Ben cao yan yi* 本草衍義 (1119), who says that it is similar to that of a large chrysanthemum or an *ai hao* artemisia, and he compares the flower to that of a chrysanthemum. Next come two Amaranthaceae, *qing xiang* 青葙⁴⁹³ and *ji guan* 雞冠.⁴⁹⁴ As for *hong lan hua* 紅藍花,⁴⁹⁵ the safflower, one of the Compositae, its leaf resembles that of the 'small thistle', *xiao ji*,⁴⁹⁶ and its flower resembles that of the 'large thistle', *da ji* 大薊,⁴⁹⁷ but is coloured red. Immediately after this comes *fan hong hua* 番紅花, saffron,⁴⁹⁸ which for Li Shizhen is the safflower of the Muslim lands of the West. In this case, the association is made through an analogy to the use in *materia medica* of the small flowers of the safflower and the stigmas of the crocus, all of which are coloured red.⁴⁹⁹ The next entry, *yan zhi* 燕脂, designates not a plant but a dye obtained from a variety of sources. Next cited are *da ji*, the 'large thistle', and *xiao ji*, the 'small thistle'. The 'head' of the small one, its capitula, 'resembles the flower of the safflower but is dark green'. Li Shizhen remarks that the

⁴⁸⁰ *Hao zhi wu zi zhe* 蒿之無子者. Li Shizhen (1975–81, p. 951).

⁴⁸¹ *Artemisia anomala* S. Moore; anon. (1977b, Fig. 1897). ⁴⁸² *Leonurus sibiricus* L. (Read 1936, no 6).

⁴⁸³ Li Shizhen (1975–81, p. 952). ⁴⁸⁴ *Leonurus pseudo-macranthus* Kitag.; anon. (1977b, Fig. 5564).

⁴⁸⁵ The identification is uncertain: *Senecio nikensis* Miq. (Read 1936, no 43).

⁴⁸⁶ *Prunella vulgaris* L.; anon. 1977b, Fig. 3752).

⁴⁸⁷ Read (1936, Fig. 46) identifies it with *Solidago virga-aurea* L. Kitamura Shiro (1985, pp. 195–6) considers that this name corresponds to two plants: in the *Ben cao gang mu*, he identifies it with *Artemisia anomala* S. Moore, and in the *Ben cao tu jing* with *Solidago virga-aurea* subsp. *asiatica* (Nakai) Kitamura.

⁴⁸⁸ The term employed by Li Shizhen is *xu* 絮, 'cotton down'.

⁴⁸⁹ *Sonchus oleraceus* L.; anon. (1977b, Fig. 2627).

⁴⁹⁰ *Serissa foetida* Comm.; Read (1936, n. 89); anon. (1977b, Fig. 1400).

⁴⁹¹ *Papaver rhoeas* L.; Read (1936, n. 489).

⁴⁹² *Inula britannica* L. var. *chinensis* (Rupr.) Regel; anon. (1977b, Fig. 4608).

⁴⁹³ *Celosia argentea* L.; anon. (1977b, Fig. 2488). ⁴⁹⁴ *Celosia cristata* L.; anon. (1977b, Fig. 2451).

⁴⁹⁵ *Carthamus tinctorius* L.; anon. (1977b, Fig. 1999).

⁴⁹⁶ *Cephalanoplos segetum* (Bunge) Kitam.; anon. (1977b, Fig. 0479); anon. (1972–6, Volume 4, p. 608).

⁴⁹⁷ *Cirsium japonicum* DC.; anon. (1977b, Fig. 0191). ⁴⁹⁸ *Crocus sativus* L.; Read (1936, n. 654).

⁴⁹⁹ Even today, safflower florets are used to replace saffron and sometimes are even fraudulently sold as saffron.

two thistles resemble each other, the only difference, apart from size, being streaks on the surface of the leaves of the large thistle. *Xu duan* 續斷,⁵⁰⁰ which is mentioned next, designates a teasel that resembles the two thistles but is more frail. *Ku ao* 苦艾⁵⁰¹ then designates a thistle the capitula of which, *tai* 薹, resembles that of the *ji* thistles. *Lou lu* 漏蘆,⁵⁰² which is named next, designates plants whose stem and leaves resemble the *bai hao* artemisia.⁵⁰³ *Fei lian* 飛廉,⁵⁰⁴ Li Shizhen tells us, is a thistle 'in the artemisia category', *hao lei ye* 蒿類也. The rest of the list is more heterogeneous. *Zhu ma* 苧麻⁵⁰⁵ designates the ramie (Urticaceae). *Qing ma* 苘麻⁵⁰⁶ is the name of an abutilon (Malvaceae) that grows in damp places. *Da qing* 大青⁵⁰⁷ designates a clerodendron (Verbenaceae), *Xiao qing* 小青⁵⁰⁸ an indigo (Leguminosae or Fabaceae). *Hu lu ba* 葫蘆巴 is fenugreek (Leguminosae).⁵⁰⁹ *Li shi* 蠹實⁵¹⁰ is an iris (Iridaceae). Then the series ends with the names of four representatives of the Compositae family: *e shi* 惡實,⁵¹¹ burdock; *xi er* 耬耳,⁵¹² the cocklebur; *tian ming jing* 天名精,⁵¹³ the flowers of which 'resemble small chrysanthemum flowers while the fruits resemble those of artemisias'; and finally *xi xian* 豨薺,⁵¹⁴ the leaves of which resemble those of the cocklebur, while its seeds resemble those of the *hao* artemisias.

It seems that in this group of plants, the parts of certain of them serve as elements of reference for descriptions by analogy: the *ai* artemisia for its smell; the *hao* artemisias for the shape of their leaves or their fruits; the *ju* chrysanthemums for their flowers; the thistles, *ji*, for the capitula; the sow thistle for its pappus and its seeds; the cocklebur for its leaves. The grouping made by Li Shizhen thus makes it possible to define a covert category that partially corresponds to the Compositae, which seems to include plants that are connected to the following few folk genera: the *ai* artemisia (characterised by its smell) and the *hao* artemisia (characterised by the shape of its leaves and fruits); the chrysanthemum, *ju* (characterised by its flower and its leaf); the thistle, *ji* (characterised by the capitulas); the sow thistle, *ku mai* (characterised by the seeds and their pappus); and the burdock, *xi er* or *cang er* (characterised by its leaves). The descriptions of other Compositae scattered throughout the various chapters of the *Ben cao gang mu* seem to me to validate this

⁵⁰⁰ *Dipsacus asper* Wall.; anon. (1977b, Fig. 4706).

⁵⁰¹ *Cirsium chinense* Gardn. and Champ.; anon. (1977b, Fig. 2622).

⁵⁰² *Rhaponticum uniflorum* (L.) DC., or also diverse *Echinops*; anon. (1977b, Fig. 5397).

⁵⁰³ *Artemisia steversiana* Ehrh. ex Willd.; anon. (1977b, Fig. 1392).

⁵⁰⁴ *Carduus crispus* L.; anon. (1977b, Fig. 0567).

⁵⁰⁵ *Bohemeria nivea* (L.) Gaud.; anon. (1977b, Fig. 2687).

⁵⁰⁶ *Abutilon theophrasti* Medic. = (*A. avicennae* Gaertn.); anon. (1977b, Fig. 2681).

⁵⁰⁷ *Clerodendron cyrtophyllum* Turcz.; anon. (1977b, Fig. 0214).

⁵⁰⁸ *Indigofera tinctoria* L.; Read (1936, n. 394); anon. (1977b, Fig. 0707).

⁵⁰⁹ *Trigonella foenum-graecum* L.; anon. (1977b, Fig. 3221).

⁵¹⁰ *Iris pallasi* Fisch. var. *chinensis* Fisch.; anon. (1977b, Fig. 0608).

⁵¹¹ *Arctium lappa* L.; anon. (1977b, Fig. 0861).

⁵¹² *Xanthium strumarium* L.; Read (1936, n. 50), Kitamura Shiro (1985, p. 200).

⁵¹³ *Carpesium abrotanoides* L.; anon. (1977b, Fig. 0651).

⁵¹⁴ *Siegesbeckia orientalis* L. var. *pubescens* Makino; anon. (1977b, Fig. 5321).

hypothesis. In *juan* 12, *shu* 术⁵¹⁵ is a 'mountain thistle', *shan ji* 山薊; the leaves of *san qi* 三七⁵¹⁶ resemble those of the chrysanthemums, *ju*, and the *ai* artemisias, and the flowers, once dried, release pappus like those of the sow thistle. In *juan* 14, Li Shizhen notes that *ai na xiang* 艾納香⁵¹⁷ resembles a very small *ai* artemisia, *lan cao* 蘭草⁵¹⁸ and the chrysanthemum as to its leaf; while *ze lan* 澤蘭⁵¹⁹ is very close to the preceding plant; and *ma lan* 馬蘭⁵²⁰ resembles the latter but has a bad smell, while, because of its flower, it is also called the 'purple chrysanthemum', *zi ju* 紫菊. In *juan* 16, the descriptions of two asters, *zi wan* 紫苑 and *nu wan* 奴苑, refer to no other plant, unlike *kuan dong hua* 款冬花⁵²¹ the coltsfoot, about which we are told that it has a flower similar to that of the chrysanthemum. A synonym makes *shu qu cao* 鼠曲草⁵²² a 'yellow artemisia', *huang hao* 黃蒿. The young leaf of *jin zhan cao* 金盞草⁵²³ a marigold, is said to resemble that of the wild lettuce, *wo ju* 萵苣, whereas no details are given about *gou she cao* 狗舌草⁵²⁴ nor about *lang ba cao* 狼把草.⁵²⁵ *Li chang* 鯉腸⁵²⁶ is compared to the lotus. In *juan* 18, *qian li ji* 千里及⁵²⁷ a ragwort, possesses a leaf similar to that of the chrysanthemum, but larger. In *juan* 27, the flowers of the sow thistle, *ku cai* 苦菜⁵²⁸ are compared to those of the wild chrysanthemum and its seeds to those of the *hao* artemisia; the flowers of a cultivated lettuce, *bai ju* 白苣, are compared to those of the sow thistle; while the wild lettuce,⁵²⁹ is recognised to be similar to the cultivated lettuce in its leaves, flowers and seeds. We are told that the dandelion, *pu gong ying* 蒲公英⁵³⁰ although smaller, resembles the sow thistle in its stem, its leaf, its flower and its pappus.

Thus, alongside the criteria that Li Shizhen himself declares to be the basis of his classification of *materia medica*, 'colour, perfume, *qi* and taste', morphological characteristics also allow him implicitly to group together plants the species of which are today classified in the same botanical families. As I have shown above, the descriptions that Li Shizhen gives of these plants do reveal common characteristics but what is striking is that, for the whole collection of names that designate the plants in these 'natural' groups, the lexical structuring is extremely weak, for most of the terms possess no element in common. However, the case of *dang gui* has just shown that for Li Shizhen the name may also be important as a classificatory tool and, before moving on to see how he analyses the problem posed by the folk genus *tong* 桐,⁵³¹ the example of the almond tree will provide another illustration of the importance of words as an implicit basis of classification. The almond tree is cited in

⁵¹⁵ *Atractylis ovata* Thunb. (= *Atractylodes macrocephala* Kidz.); anon. (1977b, Fig. 1376).

⁵¹⁶ *Gymura segetum* (Lour.) Merr. (= *Gymura pinnatifida* (Lour.) DC.); anon. (1977b, Fig. 0100).

⁵¹⁷ *Blumea balsamifera* DC.; anon. (1977b, Fig. 1177). ⁵¹⁸ *Eupatorium fortunei* Turcz.; anon. (1977b, Fig. 2841).

⁵¹⁹ *Eupatorium lindleyanum* DC.; Kitamura Shiro (1985, p. 186).

⁵²⁰ *Kalimeris indica* (L.) Schulz-Bip. (= *Aster indicus* L.); anon. (1977b, Fig. 0578).

⁵²¹ *Tussilago farfara* L.; anon. (1977b, Fig. 4782). ⁵²² *Gnaphalium affine* D. Don; anon. (1977b, Fig. 5218).

⁵²³ *Calendula arvensis* L.; anon. (1977b, Fig. 2886).

⁵²⁴ *Senecio integrifolius* (L.) Clairvill. var. *fauriei* (Lévl. and Vant.) Kitam.; anon. (1977b, Fig. 2956).

⁵²⁵ *Bidens tripartita* L.; anon. (1977b, Fig. 3909). ⁵²⁶ *Eclipta prostrata* L.; anon. (1977b, Fig. 5486).

⁵²⁷ *Senecio scandens* Buch.-Ham.; anon. (1977b, Fig. 0443). ⁵²⁸ *Sonchus oleraceus* L.; anon. (1977b, Fig. 2627).

⁵²⁹ *Lactuca sativa* L.; anon. (1977b, Fig. 3703).

⁵³⁰ *Taraxacum mongolicum* Hand.-Mazz.; anon. (1977b, Fig. 5130). ⁵³¹ See pp. 245–8 above.

the category of the five fruits⁵³² under the name *ba dan xing* 巴旦杏 (1), ‘badan apricot tree’, a term introduced by Li Shizhen, who draws attention to the synonym *ba dan xing* 八担杏 (2) used in Hu Sihui 忽思慧’s *Yin shan zheng yao* 飲膳正要 (c. +1330) and to *hu lu ma* 忽鹿麻, but without indicating its origin.⁵³³ However, under the entry *tao* 桃, peach tree, among a great number of the names of varieties, Li Shizhen again cites the almond tree – no doubt from other sources – giving two different names. He writes as follows:

bian tao 匾桃 [‘sign peach’] comes from the Territories of the South-West (*Nan Fan*). Has the form of a horizontal sign, astringent flesh, stone in the shape of a box, very sweet kernel. Foreigners are fond of it and call it the *po dan* 波淡 tree. The tree is very big.

He then immediately describes another fruit: ‘*pian he tao* 偏核桃 [‘peach with an oblique stone’], comes from Persia; long, thin shape; slanting head; a half-moon shape, a kernel of fine dimensions resembles the tips of Korean pines; it can be eaten; is of a warm nature’.⁵³⁴ The almond tree had been regarded by those who had named it earlier either as an apricot tree or as a peach tree, but Li Shizhen, relying solely on his written sources, introduces it three times in the same category: once as a main entry as a type of apricot tree and twice as secondary entries, as so many varieties of the peach tree (Table 10a, b). No doubt he had not had a chance to compare samples of the fruits or even to see the trees, for his description of the various *tong*, for example, certainly shows that his pharmacological concern was closely associated with a naturalist’s approach. But it is interesting to note that when his talents as a botanist are not displayed by his own direct observation, he resorts exclusively to philology.

While the explicit classification of plants in the *Ben cao gang mu* (see Table 11) certainly shows a coherence with the classificatory method defined, a priori, by Li Shizhen, that method does not on its own explain all his taxonomic choices for, in certain cases, as we have just seen, it is the name of the plant that becomes the fundamental criterion that makes it possible to classify it.⁵³⁵ On the other hand, within the divisions of the plant *materia medica* expressly implemented by Li Shizhen, we have just seen that another (this time implicit) classification is employed (see Table 10b). This is a very ancient ‘folk’ classification that I described in my study of the *Er ya*.⁵³⁶ This second system (see Table 12) completes the first and eventually influences how it works. Thus, in the classificatory process of Li Shizhen, the name too appears as one of the characteristics of the plant alongside others (morphology,

⁵³² *Juan* 29, section on fruits, Li Shizhen (1975–81, Volume 3, p. 1735).

⁵³³ See the discussion in Laufer (1919, pp. 405 f.). ⁵³⁴ Li Shizhen (1975–81, Volume 3, p. 1741).

⁵³⁵ Proof to the contrary is provided by the critical remarks that Zhao Xuemin 趙學敏, the author of the *Ben cao gang mu shi yi* 本草綱目拾遺 (1765), formulates in opposition to Li Shizhen in the preface, *fan*, to his book. He points out errors committed sometimes as a result of divisions, sometimes as a result of excessive groupings together, and shows that they result from the fact that Li Shizhen, unaware of certain synonyms, could classify the same plant under different rubrics and under different names or else, being misled by names, could sometimes mistakenly class together two quite different plants.

⁵³⁶ See pp. 48–52 above.

Table 10a. *Filing of almond tree as three different realities in Ben cao gang mu (1569): one kind of apricot tree and two kinds of peach tree.*

Fruits section <i>Guo bu</i> 果部	
Five fruits <i>Wu guo</i> 五果	
<i>xing</i> 杏 apricot	<i>tao</i> 桃 peach
<i>ba dan xing</i> 巴旦杏 'badan apricot' (almond)	<i>bian tao</i> 扁桃 'sign-peach' <i>pian he tao</i> 偏核桃 'peach with an oblique stone' (almond)

Table 10b. *Implicit filing of almond tree in Ben cao gang mu (1596) by Li Shizhen*

Tree <i>Mu</i> 木			
'apricot trees'		'peach-prune trees'	
杏梅		桃李	
<i>xing-mei</i>		<i>tao-li</i>	
Apricot tree	Japanese apricot tree	Peach tree	Prune tree
杏	梅	桃	李
<i>xing</i>	<i>mei</i>	<i>tao</i>	<i>li</i>
(Almond)		(Almond)	
巴旦杏		扁桃/偏核桃	
<i>Ba dan xing</i>		<i>Bian tao/ Pian he tao</i>	
'Badan apricot'		'sign-peach'/'peach with an oblique stone '	

use, taste, ecology, etc.). When these other characteristics are insufficient or lacking, it is in the end the name that may become the deciding factor as the basis for the grouping of plants.

The classificatory system of the *Ben cao gang mu* has sometimes been represented as a great step forward in the history of world botany, preceding the method of Linnaeus and richer than it.⁵³⁷ I myself find it hard to subscribe to this way of reasoning, since the two methods are fundamentally different both in form and in respect of the aim that is sought. To cite no more than the number of objects taken

⁵³⁷ See, for instance, Cai Jingfeng (1964, p. 75). Another author declares that the *Ben cao gang mu* is clearly one of the sources that inspired the establishment of the taxonomic system of Linnaeus. See Qian Yuanming (1984, p. 33). Carried away by fervour even greater, Dong Yuan (1987, pp. 323–4) writes as follows: 'This method of classifying plants of Li Shizhen's is absolutely unique and it precedes that of the creator of Western botanic taxonomy, Linnaeus, by 175 years and, furthermore, its content is far richer'. He then goes on to declare that Li Shizhen's work 'has spread almost throughout the whole world and has had an extremely stimulating effect on worldwide botany'. I have only one comment to make: given that Linnaeus's work has nothing in common with that of Li Shizhen, it is hardly possible to make a qualitative comparison between their respective ways of classifying plants. As for the supposed influence on botany of the *Ben cao gang mu*, it should be recognised that translations into Western languages, never more than partial, have addressed solely the pharmacological aspects of the work, to the exclusion of any botanical considerations, *stricto sensu*. See p. 619 below.

Table 11. *Classification of plants in Ben cao gang mu (1596) by Li Shizhen*

Sections, <i>bu</i> 部	<i>juan</i> 卷	Categories, <i>lei</i> 類	Number of kinds, <i>zhong</i> 种
<i>Cao bu</i> 草部 grasses	12	mountain herbs (1), <i>shan cao lei shang</i> 山草類上	31
	12	mountain herbs (2), <i>shan cao lei xia</i> 山草類下	39
	13	fragrant herbs, <i>fang cao lei</i> 芳草類	56
	14	herbs of humidity (1), <i>xi cao lei shang</i> 濕草類上	53
	15	herbs of humidity (2), <i>xi cao lei hsia</i> 濕草類下	73
	16	toxic herbs, <i>du cao lei</i> 毒草類	47
	17	rampant herbs, <i>man cao lei</i> 蔓草類	73+19
	18	aquatic herbs, <i>shui cao lei</i> 水草類	23
	19	herbs of stone, <i>shi cao lei</i> 石草類	19
	20	mosses, <i>tai lei</i> 苔類	16
	21	diverse herbs <i>za cao lei</i> 雜草類	11
		named [but] not used <i>you ming wu yong</i> 有名無用	153
			Total 613
<i>Gu bu</i> 谷部 grains	22	hemp-barley-rice, <i>ma-mai-dao lei</i> 麻麥稻類	12
	23	millets, <i>ji-shu lei</i> 稷黍類	18
	24	soya beans, <i>shu-dou lei</i> 菽豆類	14
	25	fermented products, <i>zao niang lei</i> 造釀類	29
			Total 73
<i>Cai bu</i> 菜部 vegetables	26	condimentary, <i>hun xin lei</i> 葷辛類	32
	27	supple-slippery, <i>ruo hua lei</i> 柔滑類	41
	28	gourd vegetables, <i>luo cai lei</i> 蘆菜類	11
	28	aquatic, <i>shui cai lei</i> 水菜類	6
	28	mushrooms, <i>zhi-er lei</i> 芝柘類	15
			Total 105
<i>Guo bu</i> 果部 Fruits	29	five fruits, <i>wu guo lei</i> 五果類	11
	30	fruits of the mountain, <i>shan guo lei</i> 山果類	34
	31	exotic fruits, <i>yi guo lei</i> 夷果類	31
	32	tasty fruits, <i>wei lei</i> 味類	13
	33	gourd fruits, <i>luo lei</i> 蘆類	9
	33	aquatic fruits, <i>shui guo lei</i> 水果類	6
	33	appendix	23
			Total 127
<i>Mu bu</i> 木部 Trees	34	odorous trees, <i>xiang mu lei</i> 香木類	35
	35	upright trees, <i>qiao mu lei</i> 喬木類	52
	36	bushy trees, <i>guan mu lei</i> 灌木類	51
	37	epiphyte trees, <i>yu mu lei</i> 寓木類	13
	37	trees in clumps, <i>bao mu lei</i> 苞木類	4
	37	assorted woods, <i>za mu</i> 雜木類	7
	37	appendix	19
			Total 181

Table 12. *Implicit folk plant taxonomy in books of materia medica (bencao)*

Unique beginner	Plants, <i>zhi wu</i> – <i>cao mu</i> 植物 草木				
Life forms	Grass, <i>cao</i> ; Tree, <i>mu</i> 草木				
Intermediate categories (generally covert)	<i>cong-suan</i> 蔥蒜 'onion-garlic'	<i>jue-wei</i> 蕨薇 'ferns'	<i>man</i> 蔓 'rampant'	<i>tao-li</i> 桃李 'peach-prune'	<i>song-bai</i> 松柏 'pine-cypress'
Generic specieme	<i>cong</i> 蔥 'onions'	<i>suan</i> 蒜 'garlics'	<i>jue</i> 蕨 'ferns'	<i>tao</i> 桃 peach	<i>li</i> 李 plum
Folk variety	<i>yang cong</i> 洋葱 onion	<i>da suan</i> 大蒜 garlic	<i>wei</i> 薇 osmunda	<i>gua</i> 瓜 gourd	<i>zhu</i> 竹 bamboo
				<i>xi gua</i> 西瓜 watermelon	<i>ying tao</i> 櫻桃 cherry
					<i>zao</i> 棗 jujube
					<i>xing-mei</i> 杏梅 'apricots'

into consideration, Linnaeus, with his artificial system, proposes a practical means of classifying and naming tens of thousands of natural objects both already discovered and yet to be discovered. Li Shizhen is not a naturalist exploring nature. In his analysis of plants, his concern is not to discover more of them so as to push back the boundaries of the unknown, but simply correctly to identify the medicinal products that they produce and to verify the information that he has gleaned about them in his reading. He therefore takes as his starting point primarily and above all the writings of his predecessors. If he innovates at all, it is in the uses of those products. He introduces hardly any plants that he himself has discovered.⁵³⁸ His originality consists in adding to the *materia medica* products already known that he judges to be interesting from what others have written about them or even from hearsay.⁵³⁹ Li Shizhen is first and foremost a doctor writing about plant, animal and mineral *materia medica*. His botany falls into the domain of ethnobotany, not scientific botany. When he records observations about plants, animals or even minerals, he is neither a botanist, a zoologist nor a mineralogist, but simply a member of the Confucian literate elite practising what he calls *ge wu zhi xue* 格物之學, a 'study of the investigation into things'. If one wishes to compare this naturalist aspect of his work, it should not be to that of a man such as Linnaeus, who operates in a very different scientific context, in 18th-century Europe, where botany had become a science in its own right and was now autonomous with regard to medicine. Instead, a comparison with the *Historia Generalis Plantarum* (A General History of Plants) by the Frenchman Jacques Dalechamp, one of his European contemporaries, might well be worthwhile.⁵⁴⁰

Here, then, is a brief note on Jacques Dalechamp (1513–88). Little is known about his life. After studying medicine in Montpellier (1545–7), in 1552 he settled in Lyon, where he worked as a doctor. His *Historia Generalis Plantarum* was published in Latin in Lyon in 1586–7 and a French translation of it appeared, also in Lyon, in 1653. The *Ben cao gang mu*, which was completed in 1578, was later, in 1596, published by the author's descendants⁵⁴¹ in Jinling (Nanjing). The methods of these two authors were analogous. Both relied on ancient texts and endeavoured to identify correctly the plants that these cited. They both considered this work to be fundamental, for any error would be likely to lead to grave consequences in medical practice. However, they did not limit themselves to a philological study. Dalechamp, who was an eminent doctor, was also a well-known botanist. He engaged in scientific correspondence with other European scholars,⁵⁴² possessed a famous herbarium, botanised in the Alps in particular⁵⁴³ and introduced into his book many descriptions of new plants. Li Shizhen, for his part, made enquiries among peasants⁵⁴⁴ and frequently noted details regarding their use or lack of use of medicinal plants and their cultivation. Here we find a first difference between them. When engaged in

⁵³⁸ Except perhaps a few plants that he may have collected on his visits to Wu-dang, such as that 'one-thousand-year-old Artemisia', *qian nian ai* (Li 1977–81, Volume 2, p. 941), cited above. See above, p. 83.

⁵³⁹ Métaillé (2001a). ⁵⁴⁰ I am here drawing on the main lines of an earlier article, Métaillé (1989).

⁵⁴¹ Ma Jixing and Hu Naichang (1985, p. 115). ⁵⁴² See Schmitt (1977). ⁵⁴³ See Christ (1917).

⁵⁴⁴ See Zhou Yimou (1985, pp. 54–7).

fieldwork, Dalechamp behaved as a botanist, whereas Li Shizhen engaged mostly in ethnobotanical enquiries. One important divergence is certainly that Dalechamp had no hesitation in taking into account and naming plants that did not figure in his reference texts from antiquity, essentially the works of Dioscorides. Here is his advice as to how to proceed when undertaking botanical excursions in order to recognise plants:

We should try first to know them all in general; then notice those that can be related to the description that the Ancients provided and to the names that they gave them. And as for the other plants that they left aside or that they did not know of, we should describe them very precisely and bestow upon them names that befit them.⁵⁴⁵

Another element of difference is the very natures of the two works. Li Shizhen's book records *materia medica* as a whole – mineral, plant and animal – and provides a considerable number of medicinal recipes. Dalechamp, for his part, devotes himself exclusively to plants. His *Historia* mentions 2,731 named plants, whereas the *Ben cao gang mu* mentions only 1,096. Li Shizhen's classification of plants has been described above. Here, now, is the way that Dalechamp worked. He divided all the plants into eighteen chapters, which he called 'books' and which filled two volumes. For the sake of convenience I am adopting the terms used in the French edition. Every book title begins with a 'Description and portrait'. This means that for each named plant there is a text and a corresponding image. Here is a list of the plants that are successively studied:

Trees that grow in forests without being planted.

Shrubs that grow of their own accord among hedges and bushes.

Trees that grow in orchards

Country vegetables and other grasses that grow amid the wheat in ploughed fields.

Edible and other grasses that grow in gardens.

Plants with umbels.

Plants that are recommended because of their beautiful flowers.

Fragrant plants. Plants that are used to make hats and bouquets.

Plants that come in marshy places.

Grasses that grow in harsh, stony, sandy and sheltered places.

Plants that grow in shady, damp, marshy and lush places.

Plants that grow in and alongside the sea.

Plants that cannot grow upright without being supported.

Thistles and other thorny and prickly plants.

Bulbous plants and those with roots that are lumpy or knotted.

Purgative plants.

Poisonous plants.

Foreign plants.

⁵⁴⁵ Dalechamp (1653, Volume 2, Book 14, p. 317).

At first sight this summary seems very heterogeneous. However, a perusal of the text is informative about the author's choices. First, the general title, 'a history', in this period meant a 'description of natural things'.⁵⁴⁶ Like Li Shizhen, Dalechamp explains, at the start of the sixth book, the way in which he has proceeded. His first criterion is of an ecological nature. He writes as follows:

Those who study in order to know plants must know the place in which each of them grows, for by this means they will acquire knowledge of various plants according to the different places where nature has them grow. That is why we have taken as the first distinction between plants the diversity of the places where they grow.

Having made this point, he lists the secondary criteria that he uses:

Now we shall add other distinctions, relating to remarkable features of the plants, or to particular features or some secret and admirable property or power, beginning with the plants that produce umbels at the tip of their stem, and are, as it were, crowned by them ...⁵⁴⁷

Of the eighteen groups of plants, half (Books 1 to 5 and 9 to 12) are defined according to ecological criteria: wild trees and shrubs (Books 1 and 2); cultivated plants including garden trees (Book 3), and herbaceous plants in cultivated fields and wild plants growing among harvested crops (Book 4); kitchen-garden plants (Book 5); and wild plants from marshy places (Book 9), from dry places (Book 10), from damp freshwater places (Book 11) and from the sea (Book 12). His 'other distinctions' are based on the characteristics of plant parts, such as the flower being in umbels (Book 6), 'beautiful' (Book 7) or fragrant (Book 8); on the presence of thorns (Book 14); on the presence of particular roots (Book 15); on the plant's having a liana-type stem (Book 13). They are also based on pharmaco-dynamic properties, such as purgative (Book 16) and toxic (Book 17). Finally, foreign provenance defines the last group (Book 18). What is remarkable is that, although the aims of the books are different, nearly all Dalechamp's categories are also to be found in Li Shizhen's classification, with the exceptions of flowers with umbels, flowers with thorns, beautiful flowers and purgatives. For Dalechamp, as for Li Shizhen, there is no way of classifying a plant systematically. In both authors, the classification is, ultimately, subjective and categories are not exclusive. Dalechamp is himself well aware of this and even justifies himself, for, he writes, certain plants have to be considered alongside others 'on account of the affinity of the two and so as not to break the thread of the account'. Thus, in the case of maritime plants, he indicates those that he has had to consider alongside plants that are purgative, that bear umbels, that are bulbous and that are thorny.⁵⁴⁸

⁵⁴⁶ Littré (1974, p. 2999). ⁵⁴⁷ Dalechamp (1653, Volume 1, Book 6, p. 589).

⁵⁴⁸ This way of proceeding is reminiscent of that adopted by Chen Jiamo (1486–1570), another contemporary of Dalechamp, who, as we have seen, declares in his *Ben cao meng quan* (1565), 'The Longan, the Japanese plum and the nutmeg tree all belong to the category of fruit trees and one could almost put them in the trees section, but we are putting them in the fruit trees section'.

Now let us continue the comparison between the two books. A first notable difference concerning the illustrations leaps to the eye: in Li, the text and the images are completely separate, for the illustrations form an appendix at the end of the work, while in Dalechamp the images are closely associated with the text. Another formal difference lies in the general layout of the text. In Li Shizhen, there are three clear levels of classification: *bu*, section; *lei*, category; and *zhong*, kind; in Dalechamp we find two levels entitled 'book' and 'chapter'. *Zhong* and 'chapter' constitute the basic rubrics for each of the works and, in general, correspond to botanic species or genera or, occasionally, to folk genera. The 'books' in Dalechamp correspond to *lei*. In Dalechamp, the text of each chapter is continuous, the entry is the name of the plant, and various themes are mentioned in the margins: 'the names', 'the form', 'the place', 'the time' (of flowering and fruiting), the 'virtues' or powers and bibliographical references to the authors cited. In Li Shizhen, the text of each rubric corresponding to a kind, *zhong* 種, is also introduced by a name, chosen as the name of reference, *zheng ming* 正名, and always attested by a bibliographical reference; then follow separate paragraphs: *shi ming* 釋名, 'explanation of names', in which synonyms and etymology are noted; then *ji jie* 集解, 'collected opinions' that recapitulate the information of a botanical nature found in earlier literature and the author's own remarks. Next come various paragraphs purely on the subject of medicine, introduced by information about the pharmacological properties, *zhu zhi* 主治, of the part of the plant used as *materia medica*, followed first by reflections on those qualities, *fa ming* 發明, and finally by a series of detailed recipes for preparations, *fu fang* 附方. The declared intention, to make possible a correct use of medicinal plants, at first seems identical in the two authors. However, their ways of implementing it are formally different. Dalechamp wanted to write a 'history' for each plant cited, so he produced a continuous text written in an agreeable style. In Li Shizhen, each rubric is divided into clearly separated parts. As both these works are designed to be practical, that of Dalechamp is completed by several multilingual indices of the names of plants in a variety of languages, as well as in French, Latin and Greek, and by a very detailed list of the ailments treated, which relates the plants to the various names of the various 'chapters'. The *Ben cao gang mu* also possesses a list of symptoms and illnesses each of which is referred to the *materia medica* (*juan* 3 and 4), but there is no index of names that would make it possible to turn immediately to the rubrics concerned with the minerals, plants or animals mentioned in these two *juan*. Nevertheless, literati doctors accustomed to the practice of memorising texts cannot have had much difficulty in finding in the body of the work whatever they were seeking. The *Ben cao gang mu*, with its separation into three levels, presented the structure of a veritable 'memory palace',⁵⁴⁹ in which it is not very hard to find an object, especially as, when the number of *zhong* in a particular category, *lei*, is too great, that category is subdivided into two parts

⁵⁴⁹ On this important notion, see Yates (1984), Spence (1985).

defined by the name of the category and followed by *shang* or *xia*, as in the case of 'mountain grasses', *shan cao lei* 山草類 (thirty-one and thirty-nine *zhong*) and 'humid-ity grasses', *xi cao lei* 隰草類 (fifty-three and seventy-six *zhong*). Another similarity between the two books is connected to the implicit collection of plants belonging to the same botanical family into the same group, as we have seen in Li Shizhen's categories. Thus, in his Book 4, Dalechamp presents 'Wheats and Vegetables ...': first thirty or so Graminaceae (Poaceae), then, after several staple seeds, fourteen leguminous Fabaceae. Forty or so umbellifers (Apiaceae) are listed in Book 6, 'Plants with Umbels'. Over half of the plants in Book 8, 'Fragrant Plants ...' are Labiatae (Lamiaceae), while numerous Compositae (Asteraceae) figure in Book 14, 'The Thistles and Other Thorny and Prickly Plants'. Book 15, 'The Bulbous Plants ...' only cites plants from diverse botanical families that are, however, all monocotyledons. On the other hand, with regard to the presentation of genera, the two authors adopt opposite points of view. Li Shizhen moves from the smallest to the largest, while Dalechamp starts with the biggest trees and ends with the grasses.

A systematic comparison between the two works certainly confirms the impression that Dalechamp's is a narrative work, while Li Shizhen's is a reasoned handbook. In truth, the formal aspect of the Chinese text is very noticeable. Even if Dalechamp bases his work upon exclusively botanical criteria in order to create the umbellifer group,⁵⁵⁰ he frequently moves plants from one group to another for reasons of editorial convenience or even of 'affinities', explicitly pointing this out, as we have seen. Li Shizhen seems more strict and the implicit groups, covert categories or what Joseph Needham called 'submerged families' that appear in the work are 'split apart' into categories that are defined right from the start. For instance, of the twenty-two Labiae (Lamiaceae) identified by Read,⁵⁵¹ eleven are cited as 'fragrant grasses', six as 'grasses of damp places' and five others are assigned to five other categories. Dalechamp follows the texts of the ancients very closely. Li Shizhen often criticises his predecessors even as he cites them abundantly. Although both their ways of proceeding include reference to canonical texts and attempts to explain them, Li Shizhen seems to act more freely in relation to his primary texts. However, he introduces hardly any new plants. His work covers only a very limited part of China's flora, which is extremely rich in species, and he takes account of only half as many plants as does Dalechamp, who seems to be more curious about the plant world that surrounds him. Dalechamp is certainly first and foremost a humanist, very attentive to the writings of the great Greek and Latin authors, sources that he comments upon and analyses in his efforts to identify the *materia medica* correctly. He is a doctor who is also a botanist, as can be seen from the parts of his correspondence that have survived to this day.⁵⁵² But it is worth noting that in the case of plants unknown to the ancients for which he provides a

⁵⁵⁰ The fact is that he took over this notion from the authors of antiquity and was the first to introduce it into a modern work. See Constance (1971).

⁵⁵¹ Read (1936, pp. 30–60). ⁵⁵² Schmitt (1977, p. 401).

description and creates a name, he also suggests possible medical uses that seem indicated by their taste and their nature. For Li Shizhen, however, who is a more rigorous classifier, it seems that the botanical aspect is secondary. No plant is cited without some indication of its therapeutic value. In the category entitled 'named but not used', *you ming wu yong*, he even mentions only the pharmacological properties of the plants, showing no interest in their botanical details. For Li Shizhen, botanical knowledge is a tool placed at the service of medicine, but he devotes himself to no botanical investigations *stricto sensu*, unlike Dalechamp, who goes off to botanise in the Alps, collecting plants, noting those that were unknown to Dioscorides, describing and naming them. Jacques Dalechamp, who practised the medicine and botany of his age, holds an ambiguous position as a botanist. Some historians of science regard him as a pioneer in the investigation of alpine flora and a precursor in the establishment of the family of umbellifers;⁵⁵³ however, he certainly retained the category of 'plants used to make crowns and bouquets' out of fidelity to the ancient sources that he used. In his lifetime, his scientific influence was nevertheless considerable. A botanical genus, *Dalechampsia*, was later dedicated to him. Linnaeus, in his *Philosophia Botanica* (Botanical Philosophy), placed him among 'the botanists who have rendered great services to science' and whose '[g]eneric names designed to perpetuate [their] memory' must be religiously preserved.⁵⁵⁴ He seems to be one link in the chain of the history of modern botany. Li Shizhen's work, through its scope and value, played an undeniable role in China and in the other lands of East Asia where the reading of classical Chinese was practised: Korea, Japan and Vietnam. A large section of specialised literature was devoted to the *Ben cao gang mu*, completing, criticising and amplifying it.⁵⁵⁵ In the domain of traditional Chinese pharmacopoeia, it continues to be a source of reference in modern times. As for botany as a scientific discipline, practically speaking that was not introduced into China until the early years of the 20th century.⁵⁵⁶ But Li Shizhen, by devoting himself to the investigation of things, *ge wu zhi xue*, did also practise a form of botany, in particular in his descriptions. De facto, he has often been compared to his contemporaries in Renaissance Europe, which is why I thought that a comparison with Dalechamp would be useful. These two scholars could certainly have communicated with one another, and their ways of proceeding are basically very similar. In what respect do they differ? The fundamental difference certainly lies in their respective cultural environments. In Europe, the importance of universities, where the teaching of botany was progressively introduced, especially in medical courses,⁵⁵⁷ and the intensity of scientific exchanges certainly constituted the background to Dalechamp's work, which lay on the frontier of pharmacopoeia and what was becoming botany. To take just a few examples, among the most important authors of books devoted to natural history in the course of the 16th century, in Europe, the following may be cited: Andrea Cesalpino (1519–1603), Jean Ruellius

⁵⁵³ Constance (1971, p. 2).

⁵⁵⁴ Linné [Linnaeus] (1788, p. 218).

⁵⁵⁵ See the case of Japan, p. 567 below.

⁵⁵⁶ See Métailié (2001c; 2002).

⁵⁵⁷ See Reeds (1976, pp. 533 ff.).

(1474–1537), Otto Brunfels (?1488–1534), Hieronymus Bock (Tragus) (1498–1544), Leonard Fuchs (1501–66), Pierandrea Matthioli (1501–77), William Turner (1510–68), Valerius Cordus (1515–44), Konrad Gesner (1516–65), Rembert Dodoens (1516–86), Jacob Dietrich (Theodorus Tabernaemontanus) (1520–90), Charles de l'Écluse⁵⁵⁸ (Carolus Clusius) (1525–1609), Mathias de Lobel (1538–1616), John Gerard (1545–1612), etc. Between 1500 and 1599, no fewer than fifty-seven books on plants, some of which ran into several editions, were published. Clearly, in China, Li Shizhen found himself in an altogether different context, in which there were probably few, if any, exchanges in the domain of the study of plants. In proof of that assertion, it should be noted that, among the 992 titles of works that he cited as sources for the *Ben cao gang mu*,⁵⁵⁹ there are only five contemporary authors of treatises on *materia medica*, whereas Gaspard Bauhin (1560–1624), in the first pages of his *Pinax Theatri Botanici* (1623), mentions the names of 200 contemporary authors of books on plants and adds the names of sixty-five correspondents who have supplied him with seeds or plants. Even if, in this same period, there developed in South China and in the capital 'an intense social life in literate circles', characterised by 'a proliferation of associations and clubs, schools and trends of thought',⁵⁶⁰ it seems that their participants were, above all, motivated by moral and social preoccupations rather than scientific ones. Li Shizhen was no less a naturalist than Dalechamp was; but in the case of the former, it simply was the pharmacological aspect of his work that came first, and in this domain he represented a culminating point in China. Let me quote the appreciation expressed by one of the great contemporary Chinese botanists, Hu Xiansu, who wrote as follows: 'In our country, botany was hardly developed. There were certainly a number of eminent figures such as Li Shizhen, but they were only great pharmacologists'.⁵⁶¹ In this respect, the historian of botany Julius von Sachs passed a similar judgement on Dalechamp and two of his contemporaries when he wrote,

They study plants (and this is the basis of their entire system) only from the point of view of their practical value and utility ... The writers of whom we are speaking were more preoccupied with pouring their theory into the mould of one particular form than with creating a classification system the value of which would be purely objective.⁵⁶²

This absence, in both Li Shizhen and Dalechamp, of any reasoned taxonomy draws them together and distinguishes them radically from an Andrea Cesalpino (1519–1603), for example, who, in the same period, describes around 1,500 plants in his *De Plantis* (1583) and classifies them according to an original system based on fruiting.⁵⁶³

⁵⁵⁸ About Clusius, see Egmond (2010).

⁵⁵⁹ See the bibliography, pp. 1–40, of the *Ben cao gang mu*, in Li Shizhen (1975–81, Volume 1). The five books are mentioned on pp. 10 and 11.

⁵⁶⁰ Gernet (1984, p. 28).

⁵⁶¹ Hu Xiansu (n.d., p. 2) *Wo guo zhi wu xue bu shen fa da. Xi xian ru Li Shizhen zhu gong, bu guo ben cao xue da jia*. 吾國植物學不甚發達。昔賢如李時珍諸公，不過本草學大家。

⁵⁶² Sachs (1892, p. 28).

⁵⁶³ Morton (1981, pp. 128–9). For a description of his classification, see Greene (1983, pp. 808–17). For an ethnobiological approach, see Atran (1990, pp. 154–8). On the natural history texts of the European Renaissance, see Arber (1938), Anderson (1977), Morton (1981, Chapter 5).

In the domain of natural history, even if the possible influence of the *Ben cao gang mu* on the advancement of botany in Europe has yet to be shown, that influence was undeniable in Japan, in quite original ways that we shall be analysing later.⁵⁶⁴ In China, the descriptions provided by Li Shizhen have been repeated in the form of citations in the section devoted to plants in encyclopaedias such as the *Tu shu ji cheng*. To a greater or lesser extent reordered – although this is not expressly acknowledged – they are also to be found in technical horticultural treatises, such as the *Qun fang pu* (A Treatise on Flowers) (1620) by Wang Xiangjin and also in the *Hua jing* (A Mirror of Flowers) (1688) by Chen Haozi. However, in China, as in East Asia, it is in the domain of traditional medicine that the *Ben cao gang mu* seems to me to have played a most important role. Most of the other *ben cao* texts relating to *materia medica* that were published later, not only in China but also in Korea, Japan and Vietnam, refer to it, acknowledge their debt to it or claim to complement it. Now let us see whether, in the classification of plants, this work by Li Shizhen had the same impact in China on the texts on *materia medica* that followed the *Ben cao gang mu*.

The Ben cao yuan shi

Soon after the publication of the *Ben cao gang mu*, the year 1612 saw the appearance of the first edition of the *Ben cao yuan shi* 本草原始 (Sources of *Materia Medica*) by Li Zhongli 李中立.⁵⁶⁵ The work contains twelve *juan*, seven of which are devoted to plants. The first three concern grasses, *cao*; the fourth concerns trees, *mu*; the fifth grains, *gu*; the sixth vegetables, *cai*; and the seventh fruits, *guo*. There are no subdivisions within these five categories.

The Ben cao hui yan 本草彙言

The *Ben cao hui yan* (Notes on the Classification of *Materia Medica*) (1624) by Ni Zhumo 倪朱謨 is directly inspired by the *Ben cao gang mu* with regard to the classification of *materia medica*, as is declared in the first paragraph of the introduction, *fan li*.⁵⁶⁶ Even though the order of presentation of the sections, *bu* – grasses, trees, grains, fruits, vegetables – differs from that adopted in the *Ben cao gang mu*, one finds categories, *lei*, that are identical to those that Li Shizhen had defined. It is noticeable, however, that the logic of the classification of Li Shizhen – ‘from the smallest to the greatest, from the most humble to the most precious’ – has been abandoned. The arrangement of the major sections is inspired by the choices of Tao Hongjing and Tang Shenwei, although it does differ slightly. For instance, the plants are again split into two parts, grasses and wild trees on the one hand and cultivated plants on the other, but the general order that Tao Hongjing had

⁵⁶⁴ See pp. 545–67 below.

⁵⁶⁵ See below, p. 192. See also *SCC* Volume 6, Part 1, pp. 321–3; Long Bojian (1957, pp. 50–3), Okanshi Tameto (1977, pp. 241–2), Unschuld (1986, pp. 248–9).

⁵⁶⁶ Ni Zhumo (1996, 1a).

adopted in the *Shen nong ben cao jing ji zhu* is modified. The entries are presented successively in the following order: grasses (*juan* 1 to 7); trees (*juan* 8–11); metals, minerals and soils (*juan* 12 and 13); grains (*juan* 14); fruits (*juan* 15); vegetables (*juan* 16); insects (*juan* 17); birds (*juan* 18); beasts (*juan* 18); ‘scaly animals’ (*juan* 18 and 19); ‘animals with carapaces’ (*juan* 19); human (*juan* 19).

Within these major sections, *bu*, we find the categories, *lei*, of Li Shizhen, hardly changed from those of the *Ben cao gang mu*. For the grasses, the ‘various’ category, *za cao lei* 雜草類, and the ‘named but not used’ category are abandoned; likewise abandoned, in the grains section, are the ‘products of fermentation’, *zao niang lei* 造釀類, and, finally, in the fruits section, the mountain fruits, *shan guo lei* 山果類. In the grains section, Li Shizhen’s first two categories are fused into one, in which rice no longer appears as a reference category, namely *ma mai ji shu lei* 麻麥稷黍類 ‘hemp–barley–wheat–millets’. Finally, one category is added to the grasses section, namely the ‘lianas section’, *teng cao lei* 藤草類, which is distinct from that of the climbing or trailing plants, *man cao lei* 蔓草類. In the introduction to this new category, one detects the influence of an ethnobiological classification of plants that was implicit in this period. The recognition and coherence of such a folk category⁵⁶⁷ is⁵⁶⁸ clearly marked in the nomenclature in so far as only two of the twenty-three names cited as entries do not possess the morpheme *teng* 藤, ‘liana’. Most of the plants that make up this category come from the category of ‘trailing grasses’, *man cao lei*, of the *Ben cao gang mu*. Indeed, those of the ‘grasses’ that can be identified botanically are in fact plants with tenacious and ligneous stems. As we shall presently see, this ambiguity was certainly spotted by the author of the *Ben cao gang mu shi yi* 本草綱目拾遺, Zhao Xuemin 趙學敏.

The Ben cao bei yao 本草備要

The *Ben cao bei yao* (Practical Aspects of *Materia Medica*) by Wang Ang 汪昂 (in eight *juan*), the preface of which is dated 1694, collects *materia medica* of plant origin into four parts that correspond to the first four *juan*: grasses, *cao bu* 草部; trees, *mu bu* 木部; fruits, *guo bu* 果部; and grains/vegetables *gu cai bu* 穀菜部. No subdivisions are indicated.

The Ben cao pin hui jing yao xu ji 本草品彙經要續集

In 1701, almost two centuries after the completion of the manuscript of the *Ben cao pin hui jing yao* (a supplement entitled *Ben cao pin hui jing yao xu ji* (Collection of Additions to the *Ben cao pin hui jing yao*)) was completed at the instigation of the Emperor Kangxi. However, once completed, it was not thereafter published. The fact that those responsible for this collection of additions, Wang Daochun

⁵⁶⁷ The definition of the *Kangxi zi dian* (*shen ji shang*, 19a) confirms that this is a recognised folk category: ‘Today it designates all grasses that creep and stretch out like a bramble’, *jīn zōng hu cao mǎn yǎn rú lei zhē* 今總呼草蔓延如藎者.

⁵⁶⁸ See p. 26 above.

汪道純 and Jiang Zhaoyuan 江兆元, borrowed freely from the work of Li Shizhen raises the question of the degree of influence that the latter's classificatory choices exerted upon the form of this supplement. As in the *Ben cao gang mu*, the major subdivision of drugs into three pharmaco-dynamic categories – *shang*, *zhong* and *xia pin* – has disappeared, as have all references to the system of Shao Yong. The order in which the plants are presented is certainly that of Li Shizhen's five major sections: grasses, grains, vegetables, fruits and trees. However, the group of plants as a whole is not presented in succession but remains separated into two parts, grasses and grains on the one hand and vegetables, fruits and trees on the other, on either side of the sections devoted to *materia medica* of a human or animal origin. Li Shizhen's subdivisions (*lei*) have only been added where plants belonging to these groups are cited in the supplement. Thus only 'various grasses' (*za cao bu* 雜草部) figure in the grasses section *cao bu* 草部; only 'fermentation' (*zao niang bu* 造釀部) figures among the grains section *gu dou bu* 穀豆部; only 'gourd vegetables' (*luo cai bu* 葫菜部), 'aquatic vegetables' (*shui cai bu* 水菜部) and 'fungi' (*zhi er cai* 芝栢菜) figure among the vegetables section *cai bu* 菜部; and, finally, the 'gourds section' *luo bu* 葫部 is inserted among the fruits section *guo bu* 果部. Citations from Li Shizhen abound within the various rubrics devoted to each new entry. The text of the *Ben cao gang mu* is even sometimes reproduced *in extenso*, but 'split up' to suit the various rubrics that have already been indicated and that form the structure of the entries of the *Ben cao pin hui jing yao*.

The Ben cao cong xin 本草從新

1757 saw the appearance of the *Ben cao cong xin* (A Renewal of *Materia Medica*) by Wu Yiluo 吳儀洛,⁵⁶⁹ consisting of eighteen *juan*; the first twelve *juan* concern plants. This collection repeats, in a different order, the sections, *bu*, and their subdivisions, *lei*, that Li Shizhen used in the *Ben cao gang mu*. There are noticeable differences, however. The order established by Li Shizhen – grasses, grains, vegetables, fruits, trees – is replaced by the sequence grasses, trees, fruits, vegetables, grains, which is close to that which appeared in works earlier than that of Li Shizhen. Some of the subdivisions of the latter have been suppressed; for instance, in the grasses category, the 'various' ones, *za cao*, and the ones 'named but not used', *you ming wei yong*; in the category of trees, the 'various' ones also disappear and the order in which the subdivisions are presented is altered: the 'bushy' trees, *bao mu lei* 苞木類, follow the trees 'in shrubbery', *guan mu lei* 灌木類, thereby relegating the parasitic trees, *yu mu lei* 寓木類, to the last place. Li Shizhen's subdivisions for the fruits, the vegetables and the grains are retained in the same order (see Tables 13 and 14).

⁵⁶⁹ See *SCC* Volume 6, Part 1, pp. 323–5, Long Bojian (1957, pp. 73–4), Okanishi Tameto (1977, pp. 253), Unschuld (1986, pp. 173–5).

Table 13. *The presentation of materia medica of plant origin in the Ben cao cong xin by Wu Yiluo*

cao bu 草部, grasses		
juan 1	shan cao lei 山草類	51 zhong
juan 2	fang cao lei 芳草類	34 zhong
juan 3	xi cao lei 隰草類	65 zhong
juan 4	du cao lei 毒草類	34 zhong
juan 5	man cao lei 蔓草類	28 zhong
juan 6	shui cao lei 水草類	7 zhong
	shi cao lei 石草類	6 zhong
	tai lei 苔類	3 zhong
mu bu 木部, trees		
juan 7	xiang mu lei 香木類	25 zhong
juan 8	qiao mu lei 喬木類	24 zhong
juan 9	guan mu lei 灌木類	28 zhong
	bao mu lei 苞木類	4 zhong
	yu mu lei 寓木類	6 zhong
guo bu 果部, fruits		
juan 10	wu guo lei 五果類	6 zhong
	shan guo lei 山果類	15 zhong
	yi guo lei 夷果類	9 zhong
	wei lei 味類	5 zhong
	luo lei 蘿類	5 zhong
	shui guo lei 水果類	10 zhong
cai bu 菜部, vegetables		
juan 11	hun xin lei 葷辛類	33 zhong
	rou hua lei 柔滑類	20 zhong
	luo cai lei 蘿菜類	7 zhong
	shui cai lei 水菜類	5 zhong
	zhi er lei 芝栴類	4 zhong
gu bu 穀部, grains		
juan 12	ma mai dao lei 麻麥稻類	11 zhong
	ji shu lei 稷黍類	16 zhong
	shu dou lei 木豆類	12 zhong
	zao niang lei 造釀類	16 zhong
	mountain grasses	
	fragrant grasses	
	humid grasses	
	toxic grasses	
	trailing grasses	
	aquatic grasses	
	stony grasses	
	'mosses'	
	perfumed trees	
	large trees	
	shrubs	
	bushes	
	parasitic trees	
	'five fruits'	
	mountain fruits	
	exotic fruits	
	condiments	
	fruits of grasses	
	aquatic fruits	
	odorous-spicy	
	supple-slippery	
	gourd vegetables	
	aquatic vegetables	
	mushrooms	
	hemp-barley and wheat-rice	
	millets	
	soya beans	
	fermented products	

Table 14. *Classification of plants in the horticultural treatise Er ru ting qun fang pu 二如亭群芳譜 (Treatise on All the Plants of Er Ru Pavilion) (c.1620) by Wang Xiangjin 王象晉 (c.1561–1653)*

Treatise on Grains, *Gu pu* 穀譜
 Treatise on Vegetables, *Shu pu* 蔬譜
 辛葷 *xin hun* for seasoning
 柔滑 *rou hua* soft and slippery
 清涼 *qing liang* refreshing
 Treatise on Fruits, *Guo pu* 果譜
 膚果 *fu guo* with skin
 殼果 *ke guo* with stone
 瓠果 *huo guo* gourd-like
 澤果 *ze guo* aquatic
 Treatise on Tea, *Cha pu* 茶譜
 Treatise on Bamboos, *Zhu pu* 竹譜
 Treatise on Mulberry–Hemp–*Pueraria* *Sangmage pu* 桑麻葛譜
 Treatise on Medicinal Herbs, *Yao pu* 藥譜
 Treatise on Trees, *Mu pu* 木譜
 Treatise on Flowers, *Hua pu* 花譜
 木本 *mu ben* woody stem
 藤本 *teng ben* climbing stem
 草本 *cao ben* herbaceous stem
 Treatise on Grasses, *Hui pu* 卉譜

The Ben cao gang mu shi yi 本草綱目拾遺

The *Ben cao gang mu shi yi* (Supplement to the *Ben cao gang mu*) by Zhao Xuemin 趙學敏, completed in 1765,⁵⁷⁰ is a critical supplement to the *Ben cao gang mu*. A whole introductory chapter is devoted to the ‘correction of errors’ made by Li Shizhen, as is indicated by its title, *zheng wu* 正誤. Zhao Xuemin’s main concern is to simplify the task of practitioners. He therefore tries, for example, to choose to cite the plants that can be cultivated in order to proceed to make experiments. On the subject of the classification of plants, he declares,

The [*Ben cao*] *Gang mu* has no lianas section (*teng bu* 藤部). By placing the lianas (*teng*) in the group of trailing [plants] (*man lei* 蔓類), without knowing if the ligneous ones are *teng* and the herbaceous ones are *man*, it is not easy to resolve [the problems]. Therefore I here create another section for lianas (*teng man bu* 藤蔓部). The [*Ben cao*] *Gang mu* does not have a section for flowers (*hua bu* 花部). The flower is annexed to various rubrics; but among these annexes there are some that mention the root and the leaf but reject the flower; or else only the name of the flower is mentioned, with no therapeutic indications. For all these reasons, I have established a separate section for flowers (*hua bu*). Where there are supplements relating to the peduncle, these are annexed afterwards. For example, ‘the peduncle of

⁵⁷⁰ This book, which has a preface by the author dated to the thirtieth year of the reign of Qian Long (1765), was not printed until very much later, in 1871. See SCC Volume 6, Part 1, pp. 325–8, Long Bojian (1957, pp. 74–5), Okanishi Tameto (1977, pp. 253–6), Unschuld (1986, pp. 164–8).

the Japanese apricot' (*mei geng* 梅梗) is added to the 'flower of the Japanese apricot' (*mei hua* 梅花), and so on.⁵⁷¹

Respecting the basic schema of Li Shizhen, Zhao Xuemin presents plants after the sections for waters, fires, soils, metals, and minerals and before those for animals.⁵⁷² However, the order that governs the presentation of the sections concerning plants is no longer that of the *Ben cao gang mu* but is inspired by the organisation of works on *materia medica* that preceded it and also by a popular or 'folk' classification, as can be seen from the text that has been cited above to justify the introduction of sections for lianas and for flowers. The section for grasses, *cao bu* 草部, is divided into three parts (*shang* 上, *zhong* 中, *xia* 下), which occupy, respectively, *juan* 3, 4 and 5). The section for trees, *mu bu* 木部, is to be found in *juan* 6. *Juan* 7 contains the sections for lianas (*teng bu* 藤部) and flowers (*hua bu* 花部), and the first part of the section for fruits (*guo bu shang* 果部上). Lastly, *juan* 8 includes the second part of the section for fruits (*guo bu xia* 果部下), the section for grains (*gu bu* 穀部) and the section for vegetables (*shu bu* 蔬部). Apart from the division of grasses into three parts and of fruits into two, no subdivision is indicated or appears within any of these major categories. However, in his introduction, *fan li*,⁵⁷³ the author points out errors of classification on the part of Li Shizhen, in respect of both faulty groupings and mistaken distinctions. The examples cited certainly prove the importance that Li Shizhen ascribed to names and corroborate what has been shown above on the subject of the almond tree. Zhao Xuemin notes that the lack of recognition of certain synonyms leads Li Shizhen to classify the same plant in two different places because it has two different names. The introduction to the section for lianas, *teng bu*, testifies to the importance of this basic folk category⁵⁷⁴ alongside the categories for trees and grasses, and this tends to establish a link between the scholarly classifications in the *ben cao* and folk classification. The flowers section, *hua bu*, groups together 'flowers' produced by trees, grasses and lianas and so in this system it possesses a status different from that of the three other sections founded on the uses of fruits, grains and vegetables, for which Li Shizhen had provided a clear definition. This flowers section is comparable to that of 'commodities', *qi yong bu* 器用部, which groups together a variety of different objects from different provenances. It seems to me remarkable that Li Shizhen's innovative efforts, reflected in his theoretical choice of a doubly hierarchical classification (which justifies the use of the term *gang mu* 綱目 in the title of his book) and in accordance with the logic of a scale of beings, are ignored by Zhao Xuemin. Where classification is concerned, he is content, in the end, simply to criticise details and at the same time to upset the very bases of the system.

⁵⁷¹ Zhao Xuemin (1971, p. 1).

⁵⁷² On the overall classification of the *Ben cao gang mu*, see Métaillé (2001a, pp. 225–42).

⁵⁷³ Zhao Xuemin (1971, p. 2).

⁵⁷⁴ This remark is justified by the high frequency of the morpheme *teng* as the basis for the Chinese names for these plants. We have already noted that Li Shizhen eventually took this fact into account and created two sub-categories in the sections on fruit and vegetables. See p. 80 above.

The Ben cao qiu zhen 本草求真

The *Ben cao qiu zhen* (Quest for the Truth in *Materia Medica*) by Huang Gongxiu 黃宮綉, which appeared in 1778, presents the whole body of *materia medica* divided into groups that correspond to the therapeutic properties of the plants. This choice is justified by the author, who, in the introduction, *fan li*, explains that, unlike most other authors of works, who choose to separate plants, animals and minerals, he, for his part, has preferred to group together, in the same place, all the products that possess the same *qi* and the same taste, *wei*, thereby granting priority in his classification, to *materia medica yao pin* 藥品. In so doing, he recovers the spirit of the *Shen nong ben cao jing*. However, he does not neglect the nature of the products since, in accordance with the method established by Li Shizhen, alongside each name he indicates the category, *lei*, in which the drug is classed in the *Ben cao gang mu*: ‘mountain plant’, ‘large tree’, ‘odorous-spicy [vegetable]’, etc. All the same, this presentation does seem to reflect the author’s sense of the subsidiary role of these distinctions and it reminds one of Li Shizhen’s similar treatment of the ‘three ranks’, *san pin* 三品, in the works of his predecessors.

This overview of classification in works devoted to *materia medica* certainly shows that their authors considered them to be not books of natural history but medical treatises. It is nevertheless noticeable that within this group of works, the *Ben cao gang mu* stands out as exceptional by reason of the balanced interest that, in his great work, Li Shizhen manifests in both the medical aspect and its naturalist side, which he calls *ge wu zhi xue* 格物之學. All the same, the modifications introduced into the classification of plants by various other authors all tend to assimilate their outlook to what must have been manifest in ‘folk’ classifications, in particular their interest in plants with more or less supple stems and flowers. These additions or modifications seem to show that Li Shizhen, possibly out of a concern for orthodoxy, did not wish to destroy the canonical model of the five great categories of plants defined by Tao Hongjing, but did choose to render it more logical, both by working upward from ‘the smallest to the greatest’ and by integrating all plants into the model of the Five Phases, justifying this by the two remarks cited above: ‘in the grass there is the tree and in the tree there is the grass’ and ‘*mu* 木 [tree/wood] is a plant (*zhi wu* 植物) and one of the Five Phases’. At any rate, it seems clear that none of his successors were interested in proposing a more ‘naturalist’ way of classifying plants, for all their modifications were introduced with a practical aim, namely to serve a therapeutic purpose. Now let us examine the situation in another domain, that of the cultivation of plants.

(iii) *The Ming and Qing dynasties: horticultural and agricultural texts*

We have already encountered the *Qun fang pu* 群芳譜 (Treatise on All the Plants) by Wang Xiangjin 王象晉,⁵⁷⁵ and we noted its double character, at once

⁵⁷⁵ See p. 25 above.

encyclopaedic and horticultural. Only the various categories which form, as it were, so many treatises devoted to plants will be cited here. The first is the Treatise on Grains, *Gu pu* 穀譜 (*juan* 8), which contains twenty-six plants, eight of which are vegetables. Next (*juan* 9 and 10), the Treatise on Vegetables, *Shu pu* 蔬譜, divides sixty-five vegetables into the following three categories: *xin xun* 辛薰, spicy-aromatic; *rou hua* 柔滑, tender-mucilagenous; and *qing liang* 清涼, refreshing. The Treatise on Fruits, *Guo pu* 果譜, separates seventy-seven cited plants into four types, *fu guo* 膚果: fruits with skin (two *juan*); *ke guo* 殼果, fruits with shells (one *juan*); *luo guo* 蓏果, fruits of grasses or gourd fruits; and *ze guo* 澤果, fruits from pools, which all share one *juan* – apple, pear, apricot, peach, plum and jujube trees belong to the first group; the longan, pomegranate, chestnut, ginkgo and walnut trees belong to the second. These few examples remind us that *guo*, ‘fruit’, should be understood to mean the part that is eaten, not the organ of the plant in its botanical sense. If the fruits of the ginkgo⁵⁷⁶ and the walnut trees were appreciated for their flesh, not their kernels, they would have been classed in the first group. The next two *juan* are devoted, respectively, to a ‘Treatise on the Tea Plant’, *Cha pu* 茶譜, and a ‘Treatise on the Bamboo’, *Zhu pu* 竹譜. The next *juan* contains a ‘Treatise on the Mulberry–‘Hemp’–*Pueraria*’, *Sang ma ge pu* 桑麻葛譜, in a *juan* that presents six textile plants,⁵⁷⁷ while another *juan* is devoted to a ‘Treatise on Cotton’, *Mian pu* 棉譜. A ‘Treatise on Medicinal Plants’, *Yao pu* 藥譜, fills the next three *juan* (sixty-nine entries). The ‘Treatise on Trees’, *Mu pu* 木譜, then provides information about thirty-nine trees, in two *juan*. A ‘Treatise on Flowers’, *Hua pu* 花譜, in four *juan* then presents eighty-three kinds divided into three categories: *mu ben* 木本, from ligneous stock; *teng ben* 藤本, from vine stock; and *cao ben* 草本, from herbaceous stock. The fifty-seven entries of the ‘Treatise on Grasses’, *Hui pu* 卉譜, occupy the two chapters before the last one. The fact that the grasses are not mentioned under the name *cao* 草, as they are in the literature of the *ben cao*, seems to me to confirm the sense of ‘a medicinal wild herbaceous plant’ that one can infer from Li Shizhen’s remarks. On the other hand, in this context, I think that *hui* makes it possible to define a residual category, that of herbaceous plants that do not fall into any of the preceding categories. Among them we find plants that carry a strong symbolical or ritual meaning (the mushroom of immortality of the *Ganoderma zhi* genus 芝, or the milfoil, *shi* 蓍), alongside dye-producing or even foodstuff plants, such as ginger *mioga*, *rang he* 蘘荷,⁵⁷⁸ or various banana trees, *ba jiao* 芭蕉.⁵⁷⁹ In the last two cases, possibly the two facts that the former, unlike ginger, does not have the true status of a vegetable, since it is described simply as ‘edible’, and that the latter belong to the ‘category of grasses of the deities’, *xian cao lei* 仙草類, justify the decision not to put them in any

⁵⁷⁶ We should bear in mind that the ‘fruit’ of the ginkgo is not a fruit in the botanical sense of the word, but is ‘a seed plumlike and drupaceous with a fleshy outer and a horny inner layer. Lawrence (1951, p. 358).

⁵⁷⁷ ‘Textile’ by reason of their destined use, in the same way as the mulberry tree, *sang*, has leaves that are used as food for silkworms. I am using ‘hemp’ as an approximate translation for *ma*, which in this case has the generic sense of ‘plant with textile fibres’. See the passage on this subject in SCC Volume 6, Part 1, pp. 170–7.

⁵⁷⁸ *Zingiber mioga* Rosc. ⁵⁷⁹ *Musa sp.* Eight ‘kinds’ are cited, some ornamental, others edible.

other treatise – on vegetables or fruit – where they could logically be expected to be found (see Table 14).

The *Ru nan pu shi* 汝南圃史 (History of the Gardens of Runan),⁵⁸⁰ the preface to which is dated 1620, is a horticultural treatise composed by Zhou Wenhua 周文華.⁵⁸¹ The text, which begins with cultivated fruit or floral trees, is divided into ten sections,⁵⁸² *bu*, that cover all the plants to be found in gardens. The first three sections are concerned with fruits. The *hua guo bu* 花果部, ‘section on fruit trees with flowers’ or ‘with flowers and fruits’, describes the cultivation techniques relating to fruit trees that are equally valued for their blossoms, such as the Japanese apricot trees, *mei* 梅; apricot trees, *xing* 杏; peach trees, *tao* 桃; plum trees, *li* 李; pomegranate trees, *shi liu* 石榴; pear trees, *li* 梨; and cherry trees, *ying tao* 櫻桃. The *mu guo bu* 木果部, ‘section on the fruits from trees’, groups together fruit trees *stricto sensu*, and the *shui guo bu*, ‘water fruits section’, discusses seven aquatic or water-loving plants: the lotus, *he* 荷; the water chestnut, *ji* 芡; the euryale ferox or chicken-head, *qian* 芡; sugar cane, *zhe* 蔗; the watermelon, *xi gua* 西瓜; the water chestnut, *bi qi* 荸薺; and the arrowhead, *ci gu* 慈菇. Three other sections are devoted to flowers with ligneous stems, *mu ben hua bu* 木本花部; with fine twigs and thorns, *tiao ci bu* 條刺部; and with herbaceous stems, *cao ben hua bu* 草本花部. The last four sections are concerned with bamboos and trees, *zhu mu bu* 竹木部; grasses, *cao bu* 草部; vegetables, *shu cai bu* 蔬菜部; and gourds and pulses, *gua dou bu* 瓜豆部.

The last horticultural treatise that is of interest at this point is the *Hua jing* 花鏡 (Mirror of Flowers) (1688) by Chen Haozi 陳昊子.⁵⁸³ The author divides the plants of ornamental interest into three major categories: *hua mu lei* 花木類, ‘category of trees with flowers’ (100 kinds); *teng man lei* 藤蔓類, ‘category of lianas and climbers’ (ninety-two kinds); and *hua cao lei* 花草類, ‘category of grasses with flowers’ (104 kinds), thereby adopting the same point of view as Li Yu 李漁.⁵⁸⁴

The *Nong zheng quan shu* 農政全書 (1639) was compiled from the agronomic writings of Xu Guangqi 徐光啓 (1562–1633), after his death.⁵⁸⁵ Its classification takes account only of cultivated plants, which it divides between three major rubrics. The first, *shu yi* 樹藝, ‘cultivation techniques’, comprises four sections: (a) grains, *ku* 穀, divided in two subsections between cereals and other grains including

⁵⁸⁰ Runan designates a region in south-east Henan, to the south of the river Ru, a tributary of the Huai. Today the name also designates a town in this region.

⁵⁸¹ See the description on pp. 427–32 below.

⁵⁸² Wang Yuhu (1979, p. 178) counts twelve, by dividing some into two. However, the two manuscripts on which I worked and also the edition of the *Si ku quan shu cun mu cong shu* (1995, zi 81, p. 657) certainly indicate *zhu mu bu* and *gua dou bu*, respectively ‘bamboos and trees section’ and ‘gourds and pulses section’.

⁵⁸³ See the description on p. 440–2 below.

⁵⁸⁴ See below, p. 112–13. We should note that the modern editor has chosen to modify this arrangement. He has extracted from each of the three categories of the original edition the plants that are cultivated also for their fruits and has thereby introduced a new category, that of the *hua guo lei* 花果類, ‘category of flowers and fruits’ (see Yi Jingheng (1964, p. 1)), the category that we have just found in the *Ru nan pu shi* and that is also present in various ancient horticultural treatises. See section (i)(2), Treatises on horticulture, pp. 395–443, below.

⁵⁸⁵ On the *Nong zheng quan shu* and Xu Guangqi, see Hu Daojing (1983, 1985d, 1985e); SCC Volume 6, Part II; and Bray and Métaillé (2001). On Xu Guangqi in general, see Jami, Engelfriet and Blue (2001).

beans and pulses; (b) the fruits of grasses, *luo* 蘆, comprising gourds, the aubergine, root vegetables, tubers and the seeds of aquatic plants; (c) vegetables, *shu* 蔬, which include leaf vegetables, *mioga* ginger and mushrooms; and, finally (d), the fruits of trees, *guo* 果. The second, under the heading ‘Mulberry Silkworms’, *can sang* 蠶桑, concerns the raising of silkworms and the cultivation of the mulberry tree. This is followed by the ‘category of the mulberry silkworm in the wider sense’, *can sang guang lei* 蠶桑廣類, the first *juan* of which is devoted to the Indian silk-cotton tree, *mu mian* 木棉,⁵⁸⁶ while the second *juan*, under the generic heading *ma* 麻, concerns four other textile plants, the ramie, *zhu ma* 苧麻; hemp, *da ma* 大麻; the flowering maple, *qing ma* 檵麻,⁵⁸⁷ and the *Pueraria*, *ge* 葛. The third rubric, ‘Plantations’, *zhong zhi* 種植, comprises two sub-groups, trees, *mu bu* 木部, and ‘various cultivations’, *za zhong* 雜種. The latter are further divided into two groups, bamboos, tea and chrysanthemums in one and, in the other, eighteen dye-producing, medicinal and edible plants together with plants that have technical uses (as plaited mats and lamp wicks). This distribution of plants is reminiscent of that of Wang Xiangjing, discussed above.

The great agricultural encyclopaedia *Shou shi tong kao* 授時通考 (Compendium of Works and Days) was commissioned by the Emperor Qian Long, edited by Hu-Er-Tai 鄂爾泰 and presented to the throne in 1742.⁵⁸⁸ It adopts a similar way of presenting the various groups of plants. Again there are three major categories. The first, *Gu zhong men* 穀種門 (The Cultivation of Grains), contains only plants that produce subsistence foods. *Nong yu men* 農餘門 (Other Agricultural Activities) is subdivided into vegetables, *shu* 蔬; fruits, *guo* 果; trees, *mu* 木; and ‘various plantations’ *za zhi* 雜植. The vegetable group is subdivided into four sets simply numbered ‘vegetables one’, ‘vegetables two’, etc., which contain, respectively, leaf vegetables, root and stem vegetables, gourd vegetables and mushrooms, and then spices and condiments. The fruits are similarly divided into four groups. The first two present fruits of the trees of northern China, the third those of warmer regions, the fourth the fruits of grasses. Remarkably, this presentation is more or less the same as that proposed by Wang Xiangjin in the Treatise on Fruits in the *Qun fang pu*. The third major division of plants concerns the textile-producing plants, among which the most important place is reserved for the mulberry tree. Two other *juan* are devoted to ‘other textile plants’, *can yu* 參餘. The Indian silk-cotton tree occupies the greater part of the first *juan*. Alongside it are three plants destined to produce textiles, the leaves of which, like those of the mulberry tree, make it possible to feed silkworms: *zhe* 柘,⁵⁸⁹ *nu zhe* 奴柘,⁵⁹⁰ and *hao* 蒿 artemisia.⁵⁹¹ The second *juan* is essentially devoted to the various *ma* 麻 – hemp, jute, etc.⁵⁹² – and the *Pueraria*, *ge* 葛,⁵⁹³ and,

⁵⁸⁶ *Bombax malabaricum* DC.

⁵⁸⁷ *Abutilon theophrasti* Medicus (= *A. avicennae* Gaertn.); Fèvre and Métaillé (2005, p. 364).

⁵⁸⁸ See SCC Volume 6, Part II, pp. 72–4.

⁵⁸⁹ *Cudrania tricuspidata* (Carr.) Bur. (= *C. triloba* Hance); cf Feng (1983, p. 156) and Uphof (1968, p. 163).

⁵⁹⁰ *Cudrania cochinchinensis* (Lour.) Kudo and Masam.; cf anon. (1977b, Fig. 3554). ⁵⁹¹ *Artemisia* sp.

⁵⁹² For a description of the various plants whose names are based on *ma*, see SCC Volume 6, pp. 170–6.

⁵⁹³ *Pueraria lobata* (Willd.) Ohwi; see anon. (1977b, Fig. 4796).

under the heading *ba jiao* 芭蕉,⁵⁹⁴ to banana trees with textile fibres where, in the first case, *jiao ge* 蕉葛, they are extracted from the root, in the second, *shui jiao* 水蕉, from the stem.

The examples of these two agricultural treatises provide a good illustration of the nature of the classification of plants in this type of work. As one might expect, their authors have arranged them not according to botanical criteria, but according to their symbolical value and their importance in a domestic economy.

Compared to the classifications to be found in treatises on *materia medica*, the principal differences presented by these various systems of classifying plants are, on the one hand, the fact that plants with supple or climbing stems are placed at the same level as grasses and trees and, on the other hand, the emphasis that is laid on flowers and fruits. Also, it seems to me that the distinction of a category of fruit trees with flowers reveals the economic interest that might be possessed by a garden seemingly essentially intended to promote aesthetic results. The fact is that, provided the flowers were not double, beautiful blooms eventually produced abundant harvests of fruits.⁵⁹⁵ Another particular feature of these horticultural texts is the interest that they show in plants with thorny stems, which already Zhou Shihou 周師厚,⁵⁹⁶ in his *Luoyang hua mu ji* 洛陽花木記 (Notes on the Trees and Flowers of Luoyang) (preface dated 1082), had placed in a distinct category, alongside the category of 'climbing flowers', *man hua* 蔓花. Zhou Wenhua fused these two categories together in the section on plants with thin twigs and thorns, *tiao ci bu* 條刺部. Perhaps he was in this way returning to etymology, to a gloss by Guo Pu (+276–324) in the *Er ya* that explained that *teng* was a term in current use in his day to designate what the text of the *Er ya* called *lei* 藋, brambles. I have already had occasion to point out the problem posed by the nature of bamboos in a variety of plant classifications, for it is defined now as a grass, now as a tree, as in Zhou Wenhua's work. But it is certainly its status as 'neither grass nor tree', as declared first by Dai Kaizhi 戴凱之 (c.+420–+485) in the *Zhu pu* 竹譜,⁵⁹⁷ that determined Chen Haozi's choice. He sets it in his 'category of lianas and climbing plants', *teng man lei* 藤蔓類, pointing out that 'its nature is different from that of trees and that of grasses'.⁵⁹⁸ This choice helps to explain the difference in the meanings of *teng* 藤 and *man* 蔓, which has already been mentioned by some of the authors whom we have encountered, but without being clearly resolved. In the brief introduction to the chapter devoted to these plants, *teng man lei kao* 藤蔓類考 (Examination of the Category of Supple and Climbing Plants), Chen Haozi writes in the *Hua jing* (Mirror of Flowers) as follows: 'what, between Heaven and Earth, resembles a tree but is not a tree, and resembles a grass but is not a grass, is the bamboo and the

⁵⁹⁴ Although, strictly speaking, *ba jiao* is identified as *Musa basjo* Sieb. et Zucc.; see Feng (1983, p. 357). Here the term has a generic meaning.

⁵⁹⁵ Craig Clunas (1996) has produced a very stimulating analysis of the economic aspects of the Pleasure Gardens in the lower Yangzi valley during the Ming dynasty.

⁵⁹⁶ See pp. 454–8 below.

⁵⁹⁷ See the description of this work in *SCC* Volume 6, Part 1, pp. 378–87.

⁵⁹⁸ *Zhi yu cao mu yi* 質與草木異; Chen Haozi (1962, p. 233).

ganoderma (*ling zhi* 靈芝).⁵⁹⁹ He positions these two plants^j at the head of this chapter so as to indicate his respect for their exceptional elegance and their marvellous character. What I find particularly interesting in this choice is that it reveals reflection on the nature of the stems of plants, even though this does not lead to any theoretical conclusion. The descriptions of the same plants – a bramble, *tu mi* 荼靡,⁶⁰⁰ and a rose plant, *qiang wei* 薔薇⁶⁰¹ – in the *Hua jing* and the *Ru nan pu shi* agree on the fact that the former is *man sheng* 蔓生 and the latter is *teng sheng* 藤生. In my opinion, the correct translation for the former term may be ‘vine-like’ or ‘climbing’, while for the second term, even if I use the term ‘liana’ to avoid making the expression too cumbersome, it should be understood as ‘with a supple/pliant but upright stem’. In the first case the plants spread out over the ground if they are not provided with some form of support; in the second case, they are able to grow on their own to a certain height even if their habit is not rigid. Chen Haozi’s remarks testify to the existence of a classification that is close to but distinct from that which appears in works on *materia medica*. Alongside the binary opposition *cao* grass/*mu* tree, at the higher level of a classification of plants that serve as *materia medica* we find a system involving three components in which three life forms are recognised: *cao* grass, *teng man* liana/climbing, and *mu* tree.⁶⁰²

(iv) *The Ming and Qing dynasties: texts of an encyclopaedic nature*

As we have seen, the *San cai tu hui* 三才圖繪 (Universal Encyclopaedia) was composed during the second half of the 16th century by Wang Qi 王圻 and his son Wang Siyi 王思義. It was completed in 1607 (the date of the author’s preface) but was not published until after 1609 (the date of the preface by Zhou Kongqiao 周孔教). This work in 106 *juan* is divided into fourteen sections. The last two are devoted, respectively, to animals, *niao shou* 鳥獸 (six *juan*), and plants, *cao mu* 草木 (twelve *juan*). The plant section is separated into six categories, grasses, *cao* 草; trees, *mu* 木; vegetables, *shu* 蔬; fruits, *guo* 果; grains, *gu* 穀; and ornamental flowers *hua hui* 花卉. Of the 541 entries, over half concern grasses, 292 divided between six *juan*. All the information relating to other plants is divided into two *juan* for the trees (seventy-nine entries), one *juan* for vegetables (sixty-three entries) and one *juan* for fruits and grains (respectively forty and twelve entries), and the last *juan* is devoted to ornamental flowers (fifty-five entries). Here too, the terms of the entries correspond to ‘generic’ terms or to folk ‘genera-species’, which may function as species. In truth, these 541 entries refer to a far greater number of botanical species or cultivars, and the text frequently notes for an entry the existence of several *zhong* 種 or *pin* 品 that

⁵⁹⁹ *Tian ran jian si mu fei mu si cao fei cao zhe zhu yu zhi shi ye* 天壤間，似木非木，似草非草者，竹與芝是也；Chen Haozi (1962, p. 233).

⁶⁰⁰ *Rubus* sp. or *Rosa* sp. image; Chen Haozi (2006, p. 194, Plate 4: 3).

⁶⁰¹ *Rosa cathayensis* Baileg. See image in Chen Haozi (2006, p. 193, Pl. 3: 1).

⁶⁰² See the choice of Li Yu, p. 113 below.

are differentiated either by the colour of their flowers, by their period of flowering or of producing fruits, or else by the nature or form of the fruits.

The *Ge zhi jing yuan* 格致鏡原 (Mirror of the Origins of Investigation of Things) was begun in 1717 and published in 1735. Its author, Chen Yuanlong 陳元龍 (zi, Guangling 廣陵, hao, Qianzhai 乾齋, posthumous name Wenjian 文簡) introduces it as follows:

The book consists of one hundred *juan* for thirty categories. There are also categories that are not the subject of one whole *juan* and are annexed at the end of other categories. For example, 'medicinal cakes' is annexed to 'foodstuffs-drinks', 'instruments of torture' to 'arms', 'instruments for fishing, hunting and artisan work' is annexed to 'agricultural activities', 'bamboos' is annexed to 'tree', 'lianas' to 'grasses', and in this way form non-differentiated categories (*bu lei zhi lei* 不類之類), which makes it possible for all things on this Earth below to be eventually roughly [presented] in this way. Objects that appear in two forms such as silkworms [are cited] under 'weaving' and 'insects', 'peach trees' and 'pear trees' are mentioned under both 'flowers' and 'fruits', 'rhinoceros' and 'elephant' are classified under both 'precious objects' and 'wild animals', but the respective explanations are obviously different.

Of these thirty categories, *lei*, in the encyclopaedia, six concern plants: grains, *gu* 穀 (*juan* 61); vegetables, *shu* 蔬 (*juan* 62–3); trees, *mu* 木, and bamboos, *zhu* 竹 (*juan* 64–7); grasses, *cao* 草, and lianas, *teng* 藤 (*juan* 68–9); flowers, *hua* 花 (*juan* 70–3); and fruits, *guo* 果 (*juan* 74–6). The names of 862 plants in all are the subject of one rubric and there are no intermediary categories. But these rubrics are by no means of equal importance: information relating to the 'nine grains' occupies a *juan* of twenty-two files of two pages each, whereas the eleven last files of *juan* 67 suffice to record those that concern the 227 names of the bamboos that are cited. Nor is the structure of the rubrics identical. For the most complete ones, we find, first, immediately after the name, 'generalities', *zong lun* 總論, then notes relating to the nomenclature and classification under the titles *ming lei* 名類 (name category) or *xiang lei* 詳類 (correspondences). Depending on the abundance and nature of the sources, next come passages devoted to various horticultural varieties, of peony shrubs, for example, or else strange anecdotes that are reported, such as the case of the 'lotus that moves around in the night', *ye shu he* 夜舒荷, which is reported in the *Shi yi ji* 拾遺記 during the reign of Han Emperor Ling 靈 (168–89), the stem of which was six and a half feet long and carried four flowers, with leaves that opened in the night and closed up in the daytime.⁶⁰³

The next encyclopaedia, *Gu jin tu shu ji cheng* 古今圖書記成 (The [Imperially Commissioned] Compendium of Literature and Illustrations, Ancient and Modern) was an imperial encyclopaedia, but it has already been described,⁶⁰⁴ so I shall now simply remind the reader briefly of how the content of the section containing the plants, *cao mu dian* 草木典, is organised.

The first sixteen *juan* of this section concern generalities: following two *juan* headed *cao mu zong bu* 草木總部 that discuss plants in general, the next two are

⁶⁰³ *Ge zhi jing yuan* (*juan* 72, 7a).

⁶⁰⁴ See p. 6 above.

devoted to grasses, *cao* 草, then come four other *juan* devoted to trees, *mu* 木. Then the subject switches to the various parts of a plant: the leaf (*juan* 9), the flower (*juan* 10–14) and the fruit (*juan* 15–16). Some chapters correspond to categories defined by the uses of plants, such as *yao* 藥, medicinal plants (*juan* 17–22); *he* 禾, ‘grains’ (*juan* 23–4); *shu* 蔬, vegetables (*juan* 21–2); or *xiang* 香, perfumes (*juan* 316–18); *xin* 薪, wood for heating (*juan* 319); and *tan* 炭, charcoal (*juan* 320). From the point of view of classification this work presents a hybrid arrangement, putting on the same level plants that have the same plant form – grasses, trees, bamboos – and those that have a particular use – grains, vegetables, perfumes, wood for heating, charcoal. Whereas in the *Ge zhi jing yuan* the bamboos form a supplement to the trees and the lianas form a supplement to the grasses, in the *Gu jin tu shu ji cheng* there is a ‘bamboos section’, *zhu bu* 竹部 (*juan* 196), that precedes the sections devoted to various trees and a ‘lianas section’, *teng bu* 藤部 (*juan* 112), in between the sections devoted to the *Pueraria*, *ge bu* 葛部, and the grapevine *pu tao bu* 葡萄部, two plants of economic interest and of vine-like habit. The former produces food and textiles; the latter is a foodstuff.

(v) *The Ming and Qing dynasties: notes by literati*

Alongside the texts cited above, remarks found in texts that are of a very different type provide information about other possible ways of classifying plants. The notes made by literati – *bi ji* 筆記, ‘brushstroke jottings’ – frequently address the subject of plants. They are a far cry from the encyclopaedic texts, for their authors are driven by no concern for exhaustiveness but, on the contrary, write as the spirit takes them, ‘as their paintbrush moves’, *sui bi* 隨筆. The flexibility of this literary form favours a certain liberty of expression, so it may be helpful at this point to note the major divisions that Li Yu 李漁 (1611–80) detects in the plant world. In his *Xian qing ou ji* 閒情偶記 (Scattered Notes Made at Leisure) (preface dated 1671), he writes as follows at the beginning of the part devoted to plants, *zhong zhi bu* 種植部: ‘The categories and kinds of plants are very complex but by and large one can divide them into three: those from ligneous stock, those from vine stock and those from herbaceous stock’ (*cao mu zhi zhong lei ji za, er bie ji da jiao you san, mu ben, teng ben, cao ben shi ye* 草木之種類極雜而別其大較有三木本藤本草本是也) (see Table 15).⁶⁰⁵

He explains the existence of each of these three major types of plant by the depth and relative size of the root, which is considered to be the most fundamental part of plants. It is the root’s size that guarantees the strength and longevity of plants, listed, in diminishing order, from trees down to grasses. A few years later, Chen Hoazi made a similar choice for his presentation of plants of ornamental interest, as we

⁶⁰⁵ Li Yu (1991, p. 279). The rest of the text provides an illustration of one of the fundamental aspects of *ge wu* 格物, ‘the investigation of things’, for moral purposes. Taking ‘stock’ as an analogy for what forms the basis of human behaviour, Li Yu explains the importance for an individual of possessing a ligneous stock – that is to say, a strong character – whereas whoever lacks virtuous strength is like a liana and depends on others.

Table 15. *Categories of plants in Xian qing ou ji 閑情偶寄 (Scattered Notes Made at Leisure) (1671) by Li Yu 李漁*

Considering plants from an aesthetic point of view,
 'Plants categories are very complex but there are three great divisions'
 (for flowering plants):
 with woody stem, *mu ben* 木本
 with climbing stem, *teng ben* 藤本
 with herbaceous stem, *cao ben* 草本
 +
 (for their foliage)
 grasses, *conghui* 叢卉
 bamboos-trees, *zhumu* 竹木

have noted above. He divides these into three categories: trees with flowers, *hua mu lei* 花木類; lianas and vines, *teng man lei* 藤蔓類; and grasses with flowers, *cao hua lei* 草花類. As we have already noticed, in scholarly classifications such as are found in summaries or analyses of works, lianas do not figure at the same level as grasses and trees, but form a sub-group, making it possible to distinguish a category of grasses and two major types of fruit in Li Shizhen and three types of flower in Wang Xianglin. Another group of plants with an ambiguous status is formed by the bamboos which, although plants, are 'neither trees nor grasses', as Dai Kaizhi puts it at the beginning of his Treatise on Bamboos, *Zhu pu* (5th century). The place allotted to the chapters devoted to bamboos in the various works on plants clearly confirms that ambiguity. In the *Er ya*, it is in the chapter relating to grasses that the names of bamboos are cited, just as, in the *Shuo wen*, the definition of the term *zhu* (bamboo) starts with the words, 'a grass born in the winter'.⁶⁰⁶ In the *Hua jing* (1688), Chen Haozi sets bamboo in the category of 'lianas-vines'. However, Chen Yuanlong annexes bamboo to trees, while in agronomic treatises it is positioned separately among the 'varia', *za*.

(vi) *Plant classifications: an attempt at a synthesis*

The above information shows clearly that we should speak of not just one classification but of several. In the absence of an autonomous science of plants, it is in the various technical genres that refer to plants that particular different forms of classification are to be found, although there is no sign of standardisation. As the conclusions of Jiang Ying have shown,⁶⁰⁷ there are several different ways of classifying plants, depending on the nature of the works studied and the personal choices of their authors. The agricultural and horticultural texts offer a presentation of cultivated plants that is essentially based on categories defined by the use to which

⁶⁰⁶ Ding Fubao (1928, p. 1906a).

⁶⁰⁷ Jiang Ying (1980a).

the plants are put. The domain of *materia medica* is definitely the one in which, with Li Shizhen, research of a naturalist type developed, comparable to the procedures of Jacques Dalechamp, one of his European contemporaries. Li Shizhen calls it *ge wu zhi xue* 格物之學, 'the study of investigation into things'. In this respect, although I recognise in Li Shizhen a remarkable mind, I think it important to stress the fact that he is a man of his own time, not the kind of precursor of all the modern sciences relating to nature as which a certain stream of hagiography seeks to present him. In the domain of the classification of natural objects, he marks a high point in China, in that he created a complex hierarchical system with four levels. At the highest level, *gang* 綱, this recognises the sections, *bu* 部, chosen by Tao Hongjing and is integrated coherently and explicitly into the Chinese cosmological tradition. At the next, lower, level, *mu* 目, of categories, *lei* 類, he chose various criteria – morphological, ecological, utilitarian and so forth – to define arbitrary groups that made it possible to arrange objects in a subjective fashion. A herbaceous plant, for instance, can be both a poison and also a grass that grows in damp places. Such a system only allows a limited number of objects to be taken into consideration, since one's memory must be relied on in order to locate them. With those limitations and in line with an explained logic, it divides the whole group of *materia medica* (fewer than 2,000 objects) into sub-groups of a few dozen objects. Although it allows whoever is familiar with this domain to locate items of *materia medica*, it cannot produce an inventory of nature. This system does not make it at all possible to classify – in a taxonomic sense – natural objects; that is to say, simply taking as one's starting point observation of a particular plant or animal and depending exclusively upon criteria defined a priori, to discover the place and the name, both of them unique, that this particular object should occupy in a given system. Remarkably, plants, and animals and minerals too, are taken into consideration only in so far as they are connected to *materia medica*. This explains how it is that the number of names of plants that figure as entries in these works seldom exceeds a thousand. It may well be that in a culture in which apprenticeship through memorisation played a crucial role, mastering such collections of objects cannot have posed serious problems, so the way of classifying plants, animals and minerals in various works did not constitute a major scientific problem for their authors. In my opinion, the only two who made a real theoretical effort, within a cosmological framework, to classify all natural objects that were sources of *materia medica* were Li Shizhen and, to a lesser degree, Shao Yong. As we have seen, from this point of view Li Shizhen's work does not seem to have been understood, for even those who borrow most from him, such as Ni Zhumo in his *Ben cao hui yan* (1624) and Wu Yiluo in his *Ben cao cong xin* (1757), with no apparent justification redistribute his sections and some of his categories. It is nevertheless clear that the way in which *materia medica* was studied had evolved. In the classic founding work, the *Shen nong ben cao jing*, products of animal, plant and mineral origin were all presented together, without their respective natures affecting the classification, which consisted of 365 products divided into three categories, the

three *san pin*, which were based on the pharmaco-dynamic properties attributed to the *materia medica*. Now, the *Ben cao gang mu* had moved on to a classification of the sources of *materia medica* – 1,895 kinds of mineral, plant and animal – in sixteen upper sections, *bu*, and sixty-two subordinate categories, *lei*.⁶⁰⁸ The *Ben cao gang mu* seems to me to be the only work that proposes a reasoned, clearly explained system, even if it does not rate as a modern scientific taxonomy. In between those two moments, there were two crucial stages. The first was when there was introduced into the system of the three ranks a distinction between the natures of the products of *materia medica*. These were divided into different categories by Tao Hongjing in his *Shen nong ben cao jing ji zhu* 神農本草經集注 (Collected Commentaries on the *Shen nong ben cao jing*), completed around +492. Choosing to divide *materia medica* as a whole into various ‘categories of things’, *wu lei* 物類, he created groups that were presented in the following order: jades and minerals, grasses, trees, insects, animals, fruits, vegetables, grains and foodstuffs, and things that were ‘named but not used’. Each of these categories was subdivided into the three ranks or grades. This model, in which plants were divided into two groups corresponding to wild plants and cultivated ones, with animals positioned in between, was to last right down to the 15th century. In 1492, Wang Lun proposed to abandon the three grades and introduced a different order in the presentation of *materia medica*: grasses, trees, vegetables, fruits, grains, minerals, animals, birds, insects and fish, and humans (that is to say, products of the body). Less than one century later, Li Shizhen refined this schema by integrating it into a cosmological dynamic, the Five Phases, and a logic that moved from the most humble to the most precious and from the smallest to the greatest. This resulted in sixteen sections (see Table 16), subdivided into sixty theoretical categories.⁶⁰⁹ For plants, Li Shizhen retained the five categories of his predecessors, subdividing them into thirty-one categories. The order in which the plants were presented is modified in accordance with the logic of the new system: grasses (ten categories), grains (four categories), vegetables (five categories), fruits (six categories) and trees (six categories) (see Table 11).

Li Shizhen’s work represents the culminating point in the classification of plants in China prior to the introduction of modern botany. After him, some writers took over his categories. Ni Zhumo in the *Ben cao hui yan* (1624) and Wu Yiluo in the *Ben cao cong xin* (1757) rationalised the system by suppressing the ‘divers’ and ‘named but not used’ categories, but returned to the ancient order for the upper sections. Wu Qijun, in the *Zhi wu ming shi tu kao* (1848), intermingled the two levels, retaining most of the categories of grasses, which he presented respectively as *lei* in the same way as the grains, vegetables, ornamental and fragrant plants, fruits and trees.

At this point, perhaps a comparison with what happened in the West would be enlightening. Where antiquity is concerned, it is hard to compare the work of a writer such as Theophrastus with texts such as the *Er ya*, as their nature is so very

⁶⁰⁸ For a detailed description of the contents of this group of categories, see Métailié (2001a, pp. 227–34).

⁶⁰⁹ On this point, see Métailié (2001a, pp. 229–34).

Table 16. *The sixteen sections in the Ben cao gang mu*

Waters	(juan 5)	shuǐ bu 水部
Fires	(juan 6)	huo bu 火部
Earths	(juan 7)	tǔ bu 土部
Metals and Minerals	(juan 8–11)	jīn shí bu 金石部
Herbs	(juan 12–21)	cao bu 草部
Grains	(juan 22–5)	gu bu 穀部
Vegetables	(juan 26–8)	cai bu 菜部
Fruits	(juan 29–33)	guo bu 果部
Trees	(juan 34–7)	mu bu 木部
Clothes–Utensils	(juan 38)	fu qi bu 服器部
‘Insects’	(juan 39–42)	chong bu 蟲部
Scaly Creatures	(juan 43–4)	lin bu 鱗部
Shelled Creatures	(juan 45–6)	jie bu 介部
Birds	(juan 47–9)	qin bu 禽部
Quadrupeds	(juan 50–1)	shou bu 兽部
Human beings (products of)	(juan 52)	ren bu 人部

different.⁶¹⁰ The only possible comment seems to be that in Greece thinking about plant morphology and classification,⁶¹¹ as well as experimentation on plants, is attested in the texts, while the Chinese sources provide material that is less explicit and more difficult to interpret.⁶¹² What is also striking is that the classical antiquity of the West pays regular attention to facts as well as to words, whereas the Chinese sources indicate a primary interest in words. For the medieval period, to mention just a few examples, we should undertake a parallel analysis of works such as the *Tai ping yu lan* 太平御覽 by Li Fang 李昉 (925–96), the *Ben cao tu jing* 本草圖經 (c.1070) by Su Song 蘇頌 (1019–1101), the *Ben cao yan yi* 本草衍義 (+1116) by Kou Zongshi 寇宗奭 (12th century), the *Zheng lei ben cao* 證類本草 (+1180) by Tang Shenwei 唐慎微 (1056–93) on the one hand and, on the other, Book 17 of the *Etymologiae* by Isidorus Hispalensis (c.+570–636) (which concerns agriculture and plants),⁶¹³ the *De Vegetabilibus et Plantis* by Albertus Magnus (c.+1193–1280),⁶¹⁴ *The Book of the Subtleties of Divine Creatures (Physica, sive Subtilitatum diversarum naturarum creaturarum libri novem, sive Liber simplicis medicinae)* by Hildegard von Bingen (+1098–1179),⁶¹⁵ the *On Simples* by al-Ghâfiqi of Cordova (d. 1165)⁶¹⁶ and the two books on *materia medica* and ‘medicinal simples’ by Ibn-al-Baytâr, who was born in Malaga and died in 1248 in Damascus.⁶¹⁷ In both China and Europe, at the beginning of the 16th century, the study of plants still belonged entirely to the domain of medical studies and referred exclusively to ancient texts. Progressively, in Europe this situation evolved and, in the course of the 17th and 18th centuries, this resulted in the appearance of an autonomous discipline, the study of plants, that was

⁶¹⁰ See the long chapter devoted to Theophrastus in Greene (1983, Volume 1, pp. 128–211).

⁶¹¹ On these two aspects, see Book 1 of Theophrastus, *Enquiry into Plants*, by Arthur Hort (1968, pp. 3–101) and Theophrastus, *Recherches sur les plantes*, by Suzanne Amigues (1988–2006, Volume 1, pp. 1–42).

⁶¹² See above, pp. 48–56.

⁶¹³ Isidore of Seville (1981).

⁶¹⁴ Albertus Magnus (1651).

⁶¹⁵ Hildegard de Bingen (1988).

⁶¹⁶ See Hitti (1937, pp. 574–5).

⁶¹⁷ See Hitti (1937, pp. 575–6).

quite distinct from the study of *materia medica*. Once it was no longer exclusively the writings of Pliny and Dioscorides, to cite only the most important two writers, that served as the basis of teaching and were the subject of scholarly commentaries, and once plants unknown to the ancients but now observed in the environment progressively found a place in treatises, a considerable step forward seems to have been taken.⁶¹⁸ From this point onward, the field of investigation opened up considerably and very soon encompassed several thousand objects. Apart from Andrea Cesalpino and Jacques Dalechamp (1513–88), cited above, in 1613 Jean Bauhin described 4,000 plants in his *Historia Universalis Plantarum*, and Gaspard Bauhin, his brother, described over 6,000 in his *Pinax* in 1623.⁶¹⁹ Between 1686 and 1704, in the three volumes of his *Historia Plantarum*, John Ray (1623–1705) described over 10,000. Despite the floral richness of the natural environment, such a phenomenon never occurred in China, except on a much more limited scale, when Wu Qijun, in the mid-19th century, listed 1,714 names of plants as entries in the *Zhi wu ming shi tu kao*, which actually included a larger number of botanical species. It seems clear that Li Shizhen's interest in plants, with 1,096 kinds named, most of which were cultivated, had very little in common with the endeavours of men such as Cesalpino and Ray, let alone Linnaeus, even if he may certainly be compared to Jacques Dalechamp. Although the criteria observed by Li Shizhen in his classification of plants made it possible to arrange them in a certain order, that ordering, together with descriptions and illustrations, on its own did not really help to identify them correctly. The works on *materia medica* (*ben cao*) were primarily addressed to doctors who, having acquired a certain degree of empirical knowledge from some master, were then able to find their way about them quite easily. But in a quite different manner, even before Cesalpino began to propose a classification of plants based on the characteristics of their fruiting, Valerius Cordus⁶²⁰ (1515–44) had felt the need for non-analogical description and had tried to establish a preliminary terminology of morphological characteristics that made it possible to describe plants without recourse to comparisons with other, supposedly known, plants. As far as I know, no Chinese text relating to plants theoretically poses the problem of non-analogous diagnoses. Nevertheless, a similar, although unsystematic, way of proceeding does appear in certain descriptions of plants, for example in Guo Pu's commentaries on the text of the *Er ya*, which will be studied in the next chapter.

A number of hypotheses may be advanced to explain the manner in which the various modes of scholarly representation of plants developed in China. The restricted framework and small number of objects taken into account seem to me the principal reasons for the absence of any quest for a system. Wu Qijun with his handful of plants 'without names', *wu ming* 無名,⁶²¹ in the *Zhi wu ming shi tu kao* (1848) proves that the observation of plants was primarily a means of recognition – recovering knowledge that was attested or even that was supposed lost – not of exploration. A second factor is the influence of an underlying 'folk' classification,

⁶¹⁸ See Sarton (1957, Chapter 4).

⁶¹⁹ Morton (1981, p. 145).

⁶²⁰ See Greene (1983, pp. 415).

⁶²¹ See Métaillé (1993a) and below, p. 664.

attested as early as in certain passages of the *Er ya*, which is noticeable in the work of all Chinese authors and also affects literature that is not specifically botanical. One detects it, for example, in the 17th century, in the chapter ‘Jiao yu’ 教育, ‘The Education of a Foetus’, in the moralising text by Chen Longzheng 陳龍正 (1585–1645) entitled *Jia ju* 家句 (Instructions for Families),⁶²² in which a future mother is warned to avoid certain plant products: ‘spicy plants (*xin la* 辛辣) [in the category] *jiang jiao* 薑椒 [ginger-pepper],⁶²³ troubling ones (*hun zhuo* 混濁) [in the category] *cong suan* 蔥蒜 [spring onion–garlic]⁶²⁴ and acid-cold plants (*suan han* 酸寒) [in the category] *chen ju* 橙橘 [orange–tangerine].’⁶²⁵ Such categories are still used today alongside the scholarly nomenclature.⁶²⁶

⁶²² See *juan* 2, p. 16b, of the *Ji Ting wai shu* 幾亭外書, edited by Sun Fuqing in the *Zui li yi shu* 樞李遺書 (1878), in Chen Longzheng (1996). I should like to thank Jacques Gernet for bringing this text to my attention, in one of his lectures in the Collège de France (1990–1).

⁶²³ Here the term *jiao* 椒 is typically generic. It designates, in the first place, an indigenous genus the fruits and flowers of which can be used as a condiment, for instance pepper trees (*Zanthoxylum* sp.), also called ‘Chinese pepper’, ‘Sichuan pepper’ or ‘Japanese pepper’. By extension, this term also designates various plants introduced from elsewhere and used for the spicy taste of their fruits, such as black pepper, *hu jiao* 胡椒 (*Piper nigrum* L.), and various American peppers, such as varieties of *la jiao* 辣椒 (*Capsicum annuum* L.).

⁶²⁴ In this case, too, both terms are generic. The morpheme *cong* 蔥, which specifically designates the spring onion or scallion (*Allium fistulosum* L.), is part of the composition of various names such as *yang cong* 洋蔥, onion (*Allium cepa* L.); and *xiang cong* 香蔥, chive (*Allium schoenoprasum* L.). As for *suan* 蒜, it designates more specifically garlic, *da suan* 大蒜 (*Allium sativum* L.), but also is part of the composition of a number of other plants of the *Allium* genus.

⁶²⁵ Citrus fruits, the edible fruits of the *Citrus* genus, provides a good translation of this Chinese binome, in which both of the terms have an equal generic meaning. On citrus fruits, see *SCC* Volume 6, Part 1, pp. 103–16 and 363–77.

⁶²⁶ For an example, see Jiang Ying (1980a).

(g) THE DESCRIPTION AND ILLUSTRATION OF PLANTS

(1) THE CANONICAL STATE OF DESCRIPTION:

THE *ER YA* AND THE *SHUO WEN JIE ZI*

My method in the pages that follow will be to study how plants have been described and represented in the various texts that have been devoted to them since the most ancient times.¹ Given the importance of the references to the *Er ya* (Literary Expositor) and the *Shuo wen jie zi* in the lexicological tradition of the literati, as also in technical works, the first thing we must do is set out the terminology used in these works to describe plants. Moreover, this will inform readers as to the state of this terminology at two separate moments at the start of its history.

The original text of the two chapters devoted to plants in the *Er ya* contains practically no descriptions. However, for a limited number of plants, specific terms do designate certain parts of them; but only the lotus (*Nelumbo nucifera*) is provided with an exceptionally rich lexicon that covers the root, rhizome, leaf stalk, leaf, flower, fruit, seed and even embryo, all of which are given particular names.² Our principal source for a study of the descriptive terminology will therefore be the commentary of Guo Pu, who provides us with evidence from the 4th century AD.

Out of roughly 200 of the grasses, 146 are given a descriptive commentary; and eighty-five out of 100 names of trees are also glossed by Guo Pu. What kind of information do these glosses provide? Forty-seven of the grasses named and forty-two of the trees are provided with strictly non-analogical descriptions; that is to say, descriptions that do not refer to any other plant. Here are two examples:

Tui 藎: *niu tui* 牛藎³ (Guo Pu): ‘the grass that today in the Jiang Dong area is called *niu tui* is slightly over one foot tall, with a square stem and long, pointed leaves. It has a spike, and in the spike, flowers: the flowers are purple and greenish. A drink can be made from them’.

Wei 葎: *qi qu* 葎⁴ (Guo Pu): ‘this is *wu wei* 五味; climbing; fruits grouped at the head of the stem’.

In descriptions of this type, alongside morphological indications, there is information about the plant’s habitat and also the way of using it. A small number of other descriptions – concerning twenty-one grasses and six trees – are purely

¹ An initial presentation of the terminology used to describe plants is given earlier; readers should consult the chapter entitled ‘Botanical Linguistics’ in the volume that Joseph Needham and Lu Gwei-djen devoted to botany (SCC Volume 6, Part 1, pp. 117–42).

² For a detailed presentation of this terminology, see SCC Volume 6, Part 1, pp. 134–6.

³ Bretschneider (1893, no 117) identifies it as a *Rumex*.

⁴ Bretschneider (1893, no 149) identifies it as a *Schizandra*.

analogical: ‘resembles ...’ or ‘from the group of ...’ are the only information provided in order to identify the cited plant. For example, for *su* 薹:⁵ *mu mao* 牡茅, Guo Pu’s commentary indicates ‘of the *bai mao* 白茅 group’;⁶ in the case of *meng* 蓋: *lang wei* 狼尾,⁷ Guo Pu states, ‘resembles *mao*, and is nowadays used to roof houses’.⁸ Guo Pu then explains forty-six names of grasses and twenty-three names of trees by means of glosses that combine both of the preceding types by associating an analogical reference to one or several other plants with morphological or ecological details, as for *ling* 藟:⁹

ling 藟: *da ku* 大苦: ‘Nowadays *gan cao* 甘草 (liquorice); grows by extending vine shoots; the leaf resembles the lotus, dark green and yellow; red stem with knots; knots and branched stems opposite one another. It is also said that the *ling* resembles *di huang* 地黃 [Rehmania].’

In these cases, the plant cited as being analogous serves implicitly as a reference for size, colour and shape, for the described plant is compared to it, as in the case of *xi* 蓐: *tu kui* 兔葵¹⁰ that ‘closely resembles the mallow but is smaller; the shape of its leaf is like [that of] the chenopodium; hairy’.

Finally, another way of identifying a plant consists in simply indicating a contemporary name that is synonymous with those that appear in the original text of the *Er ya*. This is how Guo Pu proceeds for thirty-two names of grasses and fourteen names of trees. But we should bear in mind that Guo Pu, in his commentary, is acting as a lexicographer, not a botanist, and that the *Er ya* is a thematic dictionary, not a botanical treatise. Nevertheless, an analysis of these two chapters devoted to plants provides a picture of the way that plants were named, classified and perceived in the 4th century in China.¹¹ Now let us consider which plant parts are taken into consideration in Guo Pu’s descriptions. First here is some indication of the numbers involved: in the 231 entries that comprise descriptive commentaries, the leaf, *ye* 葉, is mentioned fifty-one times; fruiting, *shi* 實, appears twenty-six times, *zi* 子 twenty-seven times. The flower, *hua* 花, is referred to twenty-three times, the stem fifteen times and the root nine times. But the greatest number of occurrences is that of the morpheme *sheng* 生,¹² which appears in more than sixty commentaries and, depending on context, refers to the environment in which the plant grows (mountain, cultivated fields, the edges of fields, road edges, freshwater, the sea), to its mode of growth (in clumps, *cong sheng* 叢生; climbing,

⁵ Bretschneider (1893, no 183), identifies it as an Imperata. ⁶ *Bai mao shu* 白茅屬.

⁷ Bretschneider (1893, nos 20 and 459). This could be *Pennisetum purpurascens* Makino; Jia Zuzhang and Jia Zushan (1955, Fig. 2042).

⁸ Kinds of Imperata are, still today, used as a roofing material, hence the French name for *Imperata cylindrica* (L.) Beauv.: *herbe à paillotes* – ‘grass for a grass hut’.

⁹ Bretschneider (1893, no 199). On the basis of the commentary by Guo Pu, this is identified as a kind of liquorice.

¹⁰ According to Bretschneider (1893, no 115), this could be a mallow or an anemone.

¹¹ As has been shown above, pp. 48–56. ¹² Literally ‘to be born’, ‘to live’.

man sheng 蔓生; epiphyte, *ji sheng* 寄生) or to a particular moment of its growth (the morning, *chao sheng* 朝生; at first, *chu sheng* 初生).

Where morphology is concerned, it is thus the leaves and the fruit that seem most important in the recognition of plants. For leaves, what is most often mentioned is the dimension (*da* 大, large; *xi* 細, thin; *xiao* 小, small; *hou* 厚, thick); the shape is often indicated by analogy with another plant but the following descriptive epithets also occur: *yuan* 圓, round; *rui* 銳, pointed; *qi* 岐, branching. The presence of hairs, *mao* 毛, or thorns, *ci* 刺, is indicated; as for taste, its acidity, *cu* 醋, or bitterness, *ku* 苦, is noted and there are also mentions of the smell (*xiang* 香, perfumed) and the texture (*hua* 滑, mucilaginous, or *zhi* 脂, greasy). Finally, colour is also a criterion that is noted and, in one case,¹³ even that of the periphery, *biao* 表, as opposed to that of the central part, *li* 里, of the leaf. I have found references to the following colours: *chi* 赤, red (sixteen occurrences); *bai* 白, white (ten occurrences); *zi* 紫, purple (nine occurrences); *huang* 黃, yellow (seven occurrences); *hei* 黑, black (four occurrences); *qing* 青, dark green (three occurrences); *piao* 縹, greenish (one occurrence); and in one case *za se* 雜色, 'mixed colours'. Even nuances are specified, purple being almost always associated with some other colour: *zi chi* 紫赤, *zi hei* 紫黑, *zi huang* 紫黃, *zi piao* 紫縹. The parts of the plant for which a colour is indicated are, in order of frequency, the flower, the fruit or seed, the stem, the leaf, the root, the skin and the sap. In the cases of the lotus and another aquatic plant, *Limnanthemum nymphoides* Link., the leaves are indicated by specific terms, respectively *xia* 薹¹⁴ and *fu* 苻.¹⁵

Where fruits are concerned, the terms *shi* 實 and *zi* 子 are polysemic. They seem to be synonymous in the majority of cases and to designate the fruit of a plant, but *shi* also means 'to bear fruit' and *zi* sometimes refers only to the seed, as in the case of the lotus, where it is the receptacle that is considered as the fruit, *shi*, which bears the seeds, *zi*. A fruit is often described by comparison to that of another plant. Taste (bitter, *ku* 苦; acid, *cu* 醋; or sweet, *tian* 甜), colour, shape ('like a finger', 'like a grain of wheat', 'like the teeth of a harrow') and edibility are also criteria of determination. The presence or absence of a stone, *he* 核, is also noted and, in the case of the group of peach-plum trees that the text of the *Er ya* characterises by their stones, Guo Pu comments, 'Inside the fruit, there is a stone and a kernel' *zi zhong you he ren* 子中有核仁.¹⁶ As well as *shi* and *zi*, we find a dozen or so terms that designate fruits or types of particular fruit: *cuo* 藎 is the silicle of *ji* 薺;¹⁷ *jia* 莢 in one case designates the pod of a bean and elsewhere the samara of an elm; while *yi* 夷 is the samara of another elm; *niu* 蒺 is the pod of a thick *Rhynchosia volubilis* Lour.; *qiu* 菜 is the bunch of fruits of prickly ashes;¹⁸

¹³ This plant may be a *Polygonatum* (Bretschneider 1893, no 52).

¹⁴ See Bretschneider (1893, no 99).

¹⁵ See Bretschneider (1893, no 47).

¹⁶ See Bretschneider (1893, no 330).

¹⁷ *Ji*, which today specifically designates shepherd's purse, *ji cai* (*Capsella bursa pastoris* L.), had a generic meaning in the ancient texts: it is used to designate crucifers with tiny silicles, such as *Capsella*, *Draba* and *Thlaspi*.

¹⁸ *Zanthoxylum* sp. We should bear in mind that the *Er ya* even considered it the distinctive characteristic of one group: *jiao sha chou qiu* – 'the prickly ash and the *sha* are similar because of their bunches of fruit (*qiu*)'. See Bretschneider (1893, no 329).

qiu 球, the fruit of *li* 櫟, an oak,¹⁹ is probably the acorn; *fen* 罌 is the fruit of hemp;²⁰ *shen* 葚 is the mulberry of a mulberry tree;²¹ *ti* 媿 is the fruit of the Cyperus.²² The Indian lotus is treated differently since *lian* 蓮 specifically designates the receptacle – which Guo Pu names using the general term *fang* 房 – *di* 的 are the seeds that it carries and *yi* 薏 is the germ inside those seeds.²³ The capitula of thistles carrying seeds is called *fu* 萼.²⁴ Finally, a generic term *xiu* 秀 is used to define ‘that which does not flower but does produce fruit’.²⁵ An example of this kind of fruiting is *tiao* 芳,²⁶ which is said to be characteristic of reeds. *Tiao* is considered by Guo Pu to be the equivalent of *tu* 荼. Guo Pu’s association of these two terms seems to me to be explained by the presence in both cases of a large number of small seeds topped by densely grouped pappus. This is confirmed by the analysis by Cheng Yaotian,²⁷ which will be described below and which concludes that *tiao* designates the feathery tufts of certain graminaceous plants whereas *tu* applies to the capitulate of compositae that have reached maturity.

For a flower, there are several terms that have a general sense: *hua* 花 is the most frequent; *rong* 榮²⁸ means ‘to flower’; *yu* 蓓 and *wei* 芽 designate the bud and *huang* 篁 the flower in full bloom;²⁹ *ying* 英, which stands in opposition to *xiu* 秀, which has been cited above, is ‘that which flowers and does not fruit’. *Xin* 心, the ‘heart’, yellow in the case of a *Physalis*,³⁰ probably corresponds to the central part of the flower, the anthers of which, forming the tips of the stamens, are the most visible part by reason of the colour that pollen gives them; in the case of composite flowers, *xin* designates the group of central florets. In another context, *xin* also designates the interior of a lotus seed.³¹ The term *fu* 萼, which designates the capitula of thistles that carries seeds, can also be applied to the capitula of flowers. This, at any rate, is what is suggested to me by a passage from the text of the *Er ya* that was not clear to Guo Pu but that I interpret as follows: ‘*fu* carries the flowers that are held tight within sheaths’.³² It seems that a more general term *tai* 臺 designates inflorescences that are very dense, such as the capitulae³³ of thistles and also the spikes of reed-maces, *tou tai*.³⁴ Other inflorescences in spikes such as those of sorrels and plantains are designated by another term, *sui* 穗.

¹⁹ The meaning of the explanation provided by Guo Pu, *you qiu hui zi guo* 有球彙自裹, ‘unintelligible’ to Bretschneider (1893, no 264) may be ‘the fruits that grow in groups and provide their own envelopes’ – a good enough description of the acorns of oak trees, which are partially enclosed in a cupulus.

²⁰ Bretschneider (1893, no 107).

²¹ Bretschneider (1893, no 302).

²² Bretschneider (1893, no 97).

²³ Bretschneider (1893, nos 100–1).

²⁴ Bretschneider (1893, no 208).

²⁵ *Bu rong er shi zhe wei zhi xiu* 不榮而實者謂之秀 (Bretschneider 1893, no 222). We shall be returning to an analysis of the meaning of this term. See p. 127 below.

²⁶ Bretschneider (1893, no 210).

²⁷ See, in this chapter, p. 127, and Métaillé (1992a).

²⁸ These two terms too have particular meanings in the *Er ya*: *hua* is the flower of a tree, *rong* the flower of a grass.

²⁹ Bretschneider (1893, no 215).

³⁰ Bretschneider (1893, no 144).

³¹ Bretschneider (1893, no 101).

³² *Jue tao han hua fu* (Bretschneider 1893, nos 219, 220).

³³ Guo Pu defines *gou* 鉤 (Bretschneider 1893, no 62) as ‘*yao* 芙 [*Cnidus* sp.], which has at the top of its stem a *tai* [capitula] similar to that of the *ji* 薊 [*Carduus* sp.]’. Further on (no 208), *yao* is defined by *ji* and its fruit is called *fu* 萼.

³⁴ Guo Pu’s commentary on the entry *guan* (Bretschneider 1893, no 98) reads, ‘*li* designates the summit of the *tou tai*’.

Jing 莖 is used to designate specifically the stem of herbaceous plants: Guo Pu recognises both thin ones, *xi*, and thick ones, *da*. When the colour is remarkable, he notes it: red, *zhu* 朱. A stem that is square, *fang* 方, is mentioned for a plant identified as *Leonorus sibiricus* L.³⁵ This particular shape of the stem, which is one of the characteristics of flowers belonging to the family of Labiatae³⁶ (Lamiaceae) and Verbenaceae, is also mentioned several times in the *Shan hai jing*.³⁷ One specific term, *jia* 茄, applies to the ‘stem’ of the lotus, which is really the floral scape. In fact, a number of other examples make it possible to postulate that what is perceived to be the stem of grasses is really the part that bears fruits or seeds, at the top of the plant. The trunk of trees is never named except perhaps once, as *shen* 身, the ‘body’; however, three terms exist for branches of varying sizes: *zhi* 枝 for branches, *ke* 柯 for smaller boughs and *shao* 稍 for twigs; another term, *tiao* 條, designates a group of tiny branches when these hang downward, whereas when they are upright they are called *zhuo* 櫟. The wood of the tree is named *cai* 才 and the core of the wood, used for carving, is *cai zhong* 才中, ‘the centre of the wood’. A stem may have nodes, *jie* 節, in it, as is the case of bamboos, and there are special names for these depending on whether the central part of the stem is hollow or solid: *zhong kong* 中空 or *zhong shi* 中實. In one case,³⁸ Guo Pu indicates the presence within the stem of pith, *rang* 瓤, which is ‘quite white’. Although the trunk is not named, sometimes mention is made of the thickness and appearance of the bark, *pi* 皮, the ‘skin’ of the trees (nine occurrences). The presence of thorns, *ci* 刺, is noted. A shoot is generally named *meng* 萌; that of a bamboo is called *sun* 筍, that of a reed *quan* 蘆.

Among the principal parts of a plant, the underground part is seldom mentioned: the most frequent term used is *gen* 根 (nine occurrences, eight of them for grasses). A plant’s size may be mentioned, as may its colour, odour and shape (‘like a finger’, ‘like a cowry’). In the case of a spring onion, Guo Pu reports that the root, *gen*, is *gai* 菱 (culm), and in the case of a lotus, *gen* is *ou* 藕 (rhizome). However, the lotus also commands an abundant vocabulary for the underground part of it, for the text of the *Er ya* indicates that *qi ben mi* 其本薹, ‘its base [is] *mi*’, and Guo Pu explains this in the following terms: ‘*mi* is the white *ruo* 莖 beneath the stem which is in the mud’. The term *ruo* in this case should be understood as the tiny white roots to be found at the knots of the rhizome which are, in fact, still used today in Chinese phytotherapy.³⁹

According to Guo Pu’s preface and also the bibliographies of the *History of the Sui*,⁴⁰ the commentary of the *Er ya* was accompanied by illustrations. But these no

³⁵ Bretschneider (1893, Volume 2, no 25). ³⁶ Lawrence (1951, p. 688).

³⁷ My thanks go to Rémy Mathieu for having pointed this out to me. The index of the *Shan hai jing* refers to seven plants with square stalks. Cf anon. (1948, p. 10).

³⁸ *Li nan* 離南, which Bretschneider (1893, no 82) identifies as *Tetrapanax papyrifera* C. Koch; see also Jia Zuzhang and Jia Zushan (1955, Fig. 0597). According to Li Shizhen, the envelope around the pith forms a natural paper that is used for the fabrication of decorative and ornamental objects.

³⁹ The nodes on the rhizomes of the lotus, to which delicate adventitious roots are attached, form a *materia medica* product named *ou jie* 藕節. See anon., *Yao cai xue* (n.d., p. 395), and Hu Shiuying (1980, p. 78).

⁴⁰ See preface by Zeng Yu 曾燠, in *Er ya* tu.

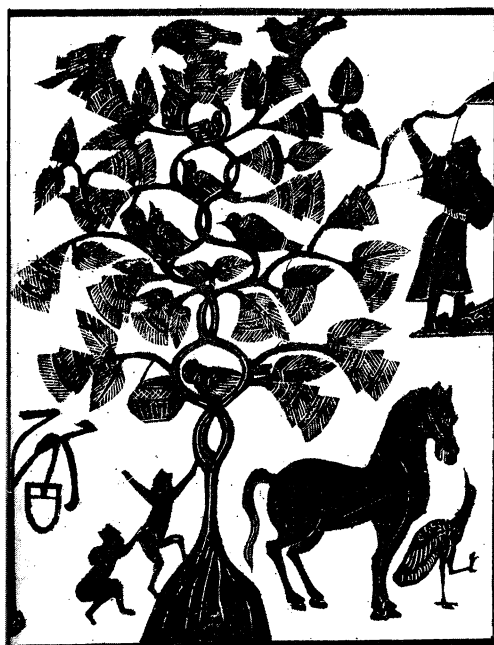


Fig. 9. Wu Liang Shrine. *Fu sang* 扶桑, the mulberry tree from which the sun rises, from Feng Yunpeng and Feng Yunyuan (1821, *shi suo san* 石索三, *san zhi shi san* 三之十三).

longer exist and the most ancient that still do date from the end of the Song period.⁴¹ A few botanical representations from the Han dynasty have come down to us but their context is quite different: they are symbolic plants that figure on certain stelae of the Wu Liang Shrine and date from the mid-2nd century.⁴² Their interest lies in the fact that they are accompanied, in some cases, by texts and ‘they can therefore be called either “annotated illustrations” or “illustrated texts”’.⁴³ These texts, together with the engravings, thus form a combination comparable to what the illustrated *Er ya* might have been, but it is not possible to confirm that these engravings are of the same kind as those of the *Er ya* (see Figs. 9 and 10).

Now that we have traced Guo Pu’s lexicographical method in his commentary on the text of the *Er ya*, we need to see how, two centuries earlier, Xu Shen 許慎, the author of the *Shuo wen jie zi* dictionary (+121), treated descriptive botanical terminology. A leaf, *ye*, is defined as ‘the leaf of grasses and trees’.⁴⁴ The two specific terms cited in the *Er ya* for the leaves of the lotus and the limnathemum are not mentioned;⁴⁵ however, commentators agree that the term *huo* 藿 has the sense of ‘soya leaf’.⁴⁶ *Te* 槐 designates ‘the thick leaf of a tree’.⁴⁷ A leaf also provides an

⁴¹ See pp. 50–1 below.

⁴² For a detailed study of the dating of the various stelae, cf Wu Hung (1989, pp. 24–30).

⁴³ Wu Hung (1989, p. 234).

⁴⁴ Ding Fubao (1928, p. 367b).

⁴⁵ Ding Fubao (1928, pp. 6901, 6909).

⁴⁶ Ding Fubao (1928, p. 240a).

⁴⁷ Ding Fubao (1928, p. 2477a).



Fig. 10. Wu Liang Shrine, from Feng Yunpeng and Feng Yunyuan (1821, *shi suo san* 石索三, *qian shi* 前石 13). Of the three plants represented on these two pages, only the last on the right side is clearly identified as *mìng jiā*, a plant of good omen.

interesting distinctive criterion in the description of a tree – identified as a liquidambar – ‘the leaves of which, when tossed about in the wind, are turned over and display a completely white underside’.⁴⁸

While the vocabulary relating to the leaf is somewhat limited, a fuller lexical collection relates to the stem. Alongside the various terms mentioned earlier in the *Er ya*, the *Shuo wen jie zi* also mentions *ting* 莖, which is glossed by *jing* 莖.⁴⁹ The stem of wheat and barley is called *juan* 稭;⁵⁰ that of *Setaria* millet *gan* 稈,⁵¹ *gao* 稈⁵² or *ji* 稈;⁵³ once it is peeled in order to be plaited, its name is *jie* 稈,⁵⁴ while the ‘skin’ is named *gao* 稈.⁵⁵ Four terms designate the tops of trees: *mo* 末,⁵⁶ *dian* 楨,⁵⁷ *miao* 杪⁵⁸ and *biao* 標.⁵⁹ A branch is also designated by *cha* 杈.⁶⁰ The bark of a tree is *po* 朴.⁶¹ The patterns formed by the structure of wood are called *li* 枋,⁶² a character that differentiates the veins in wood from those in stone, *li* 理, to which the definition refers.⁶³ Wood for carving is called *cai*, as in the *Er ya*. For bamboos, the surface or ‘skin of the bamboo’, which is green, is named *min* 篔,⁶⁴ the white interior of the bamboo *ben* 笨.⁶⁵ The spars surrounding the shoot and the sheaths surrounding the bamboo stem are called *ruo* 箬.⁶⁶ The stem of pulses, *dou* 豆, is named *qi* 萁.⁶⁷ *Meng* 萌 and *ya* 芽 define each other and mean ‘young shoot of grasses’ in the case of the former and ‘young shoot’ in the case of the latter. The ripe grain of *Setaria* millet is called *nie* 孽⁶⁸ and the young shoot is called *zhi* 稊.⁶⁹ The young shoot of the tea plant has a specific name, *ming* 茗.⁷⁰ Similarly, for bamboos, the young shoot, *meng*,

⁴⁸ Ding Fubao (1928, p. 2460a), according to the commentary by Xu Kai (920–72).

⁴⁹ Ding Fubao (1928, p. 367a).

⁵² Ding Fubao (1928, p. 3116a).

⁵⁵ Ding Fubao (1928, p. 3114a).

⁵⁸ Ding Fubao (1928, p. 2465a).

⁶¹ Ding Fubao (1928, p. 2456a).

⁶³ *Li: mu zhi li ye*, 枋木之理也, Ding Fubao (1928, p. 2484b).

⁶⁸ Ding Fubao (1928, p. 1915a).

⁶⁸ Ding Fubao (1928, p. 3158b).

⁵⁰ Ding Fubao (1928, p. 3116b).

⁵³ Ding Fubao (1928, p. 3103b).

⁵⁶ Ding Fubao (1928, p. 2453a).

⁵⁹ Ding Fubao (1928, p. 2464b).

⁶² Ding Fubao (1928, p. 2484b).

⁶⁶ Ding Fubao (1928, 1913a).

⁶⁹ Ding Fubao (1928, p. 3078a).

⁵¹ Ding Fubao (1928, p. 3115a).

⁵⁴ Ding Fubao (1928, p. 3114b).

⁵⁷ Ding Fubao (1928, p. 2462b).

⁶⁰ Ding Fubao (1928, p. 2455b).

⁶⁴ Ding Fubao (1928, p. 1914b).

⁶⁷ Ding Fubao (1928, p. 240a).

⁷⁰ Ding Fubao (1928, p. 478b).

is named *tai* 簍,⁷¹ whereas a little later in the course of its growth it becomes a ‘bamboo foetus’ and is called *sun* 筍.⁷² *Shuo wen jie zi* 說文解字 designates a ‘grass at the start of its growth’. A specific term, *da* 荅,⁷⁴ is employed for soya in this state. Another *tan* 荊 – with two synonyms – is applied to a young seedling of *guan* 藺, a plant that must have had a certain economic importance as another term designates this plant without inflorescence, *jian* 蒹.⁷⁵ The definition of *miao* 苗, ‘those grasses that grow in [cultivated] fields’, suggests that this term must not, in the context of the *Shuo wen jie zi*, carry its modern meaning of ‘young shoot’. One recent suggestion has been that it should be interpreted as a general term designating plants.⁷⁶ However, it seems to me that ‘cultivated herbaceous plants’ would fit the above cited definition better.

For flowers, one notes a number of differences from the *Er ya*: four terms designate the flowers of plants in general: *fu* 苳,⁷⁷ *pa* 葩,⁷⁸ *hua* 華⁷⁹ and *huang* 萑,⁸⁰ *wei* 葦⁸¹ is reserved for grasses, *you* is not cited; as for *rong*, which in the glosses certainly signifies ‘to flower/flower’, as an entry it is glossed by *tong mu* 桐木, Pawlonia, which picks up the definition in the *Er ya*. ‘Flowering’ seems to be an adjective particularly adapted for trees that produce an abundant and spectacular flowering before the leaves begin to grow.⁸² *Rui* 蕤 applies to flowers bent over close to the bottom,⁸³ as does *duo* 朵.⁸⁴ The flowers of some plants, finally, possess specific names of their own: *jing* 菁⁸⁵ is the flower of the Chinese onion, *jiu* 韭,⁸⁶ *han dan* 菡萏 the flower of the lotus,⁸⁷ *tiao* 芳 the inflorescence of a reed.⁸⁸ *Li* 藜 poses a problem of identification.⁸⁹ According to the *Shuo wen jie zi*, it is ‘that which is above the *li*’. According to the interpretation given to this last plant name, *li* 離,⁹⁰ it may mean an inflorescence in a spike, as in sedges, or an umbel. According to the text of the *Er ya* and for Guo Pu, it is the spike of the typha. The hypothesis of an inflorescence in a spike thus seems the most probable.⁹¹

For fruits, the *Shuo wen jie zi* distinguishes ‘that which is on trees’, *guo* 果,⁹² from ‘that which is on the ground’, *luo* 蓏.⁹³ One single term, *diao* 鹵,⁹⁴ designates the

⁷¹ Ding Fubao (1928, p. 1912b).

⁷² Ding Fubao (1928, p. 1911b). *Sun* is the term commonly used today to name shoots that are consumed as vegetables.

⁷³ Ding Fubao (1928, p. 366a). ⁷⁴ Ding Fubao (1928, p. 239b).

⁷⁵ Ding Fubao (1928, respectively pp. 333b and 332b). *Metaplexis staurtoni* R. and S. See Bretschneider (1893, nos 93 and 468). According to Tao Hongjing: ‘it is widely cultivated, its leaf is thick and large, it can be eaten raw and also steamed or boiled’. Cited in Li Shizhen (1975–81, p. 1323), *luo mo* 蘿摩. Li Shizhen reports that, in his day, the down attached to the seeds was used in place of cotton, to stuff cushions that were ‘light and warm’. The presence of this down in the fruits of plants of the Asclepiadaceae family means that ‘economically this family is important domestically for the “down” of low quality obtained from the seed’ (Lawrence 1951, p. 675).

⁷⁶ Su Baorong (1992). ⁷⁷ Ding Fubao (1928, p. 368a). ⁷⁸ Ding Fubao (1928, p. 368b).

⁷⁹ Ding Fubao (1928, p. 2699b). ⁸⁰ Ding Fubao (1928, p. 2334a). ⁸¹ Ding Fubao (1928, p. 369b).

⁸² See below, the passage devoted to *tong* trees, pp. 238–53. ⁸³ Ding Fubao (1928, p. 373a).

⁸⁴ Ding Fubao (1928, p. 2465b). ⁸⁵ Ding Fubao (1928, p. 256a).

⁸⁶ *Allium tuberosum* Rottler ex Spreng – Chinese chive, Chinese leek. ⁸⁷ Ding Fubao (1928, p. 337b).

⁸⁸ Ding Fubao (1928, p. 336b). ⁸⁹ Ding Fubao (1928, p. 388b).

⁹⁰ See the discussion in Bretschneider (1893, n. 412).

⁹¹ ‘Cylindrical spadix of Thyphaceae’ is the translation given by Needham and Lu, *SCC* Volume 6, Part 1, p. 131.

⁹² Ding Fubao (1928, p. 2454b). ⁹³ Ding Fubao (1928, p. 235b). ⁹⁴ Ding Fubao (1928, p. 3037b).

fruits of plants, grasses or trees that are bent downwards. The two most frequent general terms for the fruits of plants, *shi* 實 and *zi* 子, often appear in the short texts of definition of most of the entries that designate particular fruits, although those two terms are not themselves defined. The names of the particular fruits of shepherd's purse and of the seeds of the lotus do not figure as entries; however, *lian* 蓮 (the receptacle) is said to be the fruit of the lotus; the rest of the names of particular fruits cited in the *Er ya* all figure with the same meanings in the *Shuo wen jie zi*, with two slight exceptions: the character designating the seed of hemp is not *fen* 蕒 but *fei* 蔴⁹⁵ and the definition of the term *ban* 瓣⁹⁶ is given as 'fruits (*shi* 實) inside marrows'. The attachment of the fruit of the marrow to the stem, defined as 'the base of the marrow', *gua dang* 瓜當, is named *di* 蒂.⁹⁷ 'Fruiting *Setaria* millet⁹⁸ that one harvests [when] the cereals come to maturity' is the definition given for *sui* 穗, which, in Guo Pu's commentaries on the *Er ya*, also clearly refers to an ear of grain.⁹⁹ The use in this definition of *xiu*¹⁰⁰ – which I have translated as 'fruiting' – reappears also for the fruits of reeds. These two examples convey some idea of what the authors of the *Er ya* might mean by 'that which does not flower but does produce fruits'. This 'no flowers but fruits'¹⁰¹ seems to refer to the formation of fruits in the botanical sense in plants that do not appear to have flowered (which commonly means that have not produced on their branches or stems coloured, often perfumed, things that precede the appearance of fruit). Gramineous plants seem to me to illustrate this case, as does the metaplexis. The grains were designated by *jia* 稼.¹⁰² Another term for an ear of *Setaria* millet is *ying* 穎.¹⁰³ An ear of wheat or barley is called *mian* 麴.¹⁰⁴ When *Setaria* millet produces no grains, it is called *bi* 秕.¹⁰⁵ Three terms designate the 'skins' of grains: *kang* 糠,¹⁰⁶ *fu* 稃¹⁰⁷ and *kui* 稬.¹⁰⁸

The 'base of a tree' is called *ben* 本. But this term has a wider meaning, for it is sometimes used for *gen* 根 and also for *zhu* 株, which are defined by each other in the *Shuo wen jie zi*.¹⁰⁹ The use of *ben* is not limited to trees since it also serves to define *mi* 蔕 for the lotus.¹¹⁰ However, it seems that the most general name for a root, the underground part of a plant, is *gen* 根, while *zhu* 株 applies rather to the part of the trunk that emerges from the earth or whatever remains of a tree after it has been felled; that is to say, the stump. Apart from *gen*, which is a general word, the *Shuo wen*

⁹⁵ Ding Fubao (1928, p. 243b).

⁹⁶ Ding Fubao (1928, p. 3204b).

⁹⁷ Ding Fubao (1928, p. 375a).

⁹⁸ *He cheng xiu ye* 禾成秀也, Ding Fubao (1928, p. 3100a).

⁹⁹ This definition refers to a type of cereal harvesting in two stages: first, the ears are collected, using a harvesting knife, then the straw is cut using a sickle or a scythe. See SSC Volume 6, Part II, pp. 323–31, in particular Fig. 146. An illustration by Lou Shou, in the *Geng zhi tu*, shows, for a later period (Song or Yuan), the harvesting of rice in a single operation, using a sickle. See SSC Volume 6, Part II, p. 320, Fig. 138. On the double system of harvesting in Europe, see Haudricourt (1987, p. 234).

¹⁰⁰ It should be noted that although *xiu* is used in the text of the *Shuo wen jie zi*, it does not appear as an entry because it was taboo, since the Han emperor Guang Wu, who reigned from +25 to +56, himself went by the name Liu Xiu.

¹⁰¹ Bretschneider (1893, n. 222).

¹⁰² Ding Fubao (1928, p. 3073a).

¹⁰³ Ding Fubao (1928, p. 3097a).

¹⁰⁴ Ding Fubao (1928, p. 2311a).

¹⁰⁵ Ding Fubao (1928, p. 3116b).

¹⁰⁶ Ding Fubao (1928, p. 3112a).

¹⁰⁷ Ding Fubao (1928, p. 3111a).

¹⁰⁸ Ding Fubao (1928, p. 3111b).

¹⁰⁹ Ding Fubao (1928, pp. 2452b, 2453a).

¹¹⁰ Ding Fubao (1928, p. 340a).

jié zǐ notes specific terms for the roots of herbaceous and ligneous plants. As well as *gai* 薹, already mentioned in the *Er ya* for the roots of spring onions, but used here with the general sense of 'roots of grasses', *cao gen* 艸根,¹¹¹ *bo* 芡¹¹² also refers to the roots of grasses that are pulled up in the spring, once they dried up. One specific character, *yin* 筠,¹¹³ designates the root of *Imperata*. The rhizome of the lotus, *ou* 藕,¹¹⁴ is considered to be the root of that plant. Equally for other trees, two terms designate the root, *di* 柢¹¹⁵ and *xiao* 杓,¹¹⁶ the former seemingly more frequently used.

As well as this morphological terminology, one finds in the entries of the *Shuo wen* *jié zǐ* other terms that describe different 'states' of plants. I shall not attempt to be exhaustive on this subject, but two sets of terms refer both to herbaceous plants and to ligneous plants. *Wei* 每¹¹⁷ designates grasses that have an erect habit when mature; *mang* 𦰩¹¹⁸ refers to grasses that grow in tufts; an abundance of grasses is called *gu* 菰,¹¹⁹ *tui* 蕤¹²⁰ or *zhui* 蕤.¹²¹ Two terms evoke the perfume emitted by plants. *Fen* 芬¹²² is 'the perfume that emanates at the start of the growth of grasses', *xiang* 香¹²³ is that of cereals.¹²⁴ Two terms qualify the recovery of plants that have been knocked over, *ru* 蓐¹²⁵ for grasses and *dao* 藋¹²⁶ for both grasses and trees. The vocabulary peculiar to trees seems to testify to the steady attention that the ancient inhabitants of China paid to them. Let us consider the terminology relating to their habit. The first term, *di* 杙,¹²⁷ indicates that a tree is remarkable but gives no other specification; the second, *fu* 扶, evokes the density and abundance of its branches and foliage that spread out over a field. A (fruit) tree that does not flower is *yao* 杓.¹²⁸ The great height of a tree is described as *ge* 格,¹²⁹ *jiu* 杓¹³⁰ or *lang* 稂;¹³¹ a tree that grows crooked is *nao* 橈,¹³² if it is tall and twisted it is called *qiao* 喬;¹³³ if, like trees that grow on cliffs, it is curved, with the lower part of it bent but the upper part erect, it is *jiu* 樛.¹³⁴ The wearing away of trees by rubbing against one another is called *yi* 檉.¹³⁵ Two terms refer to trees in movement: *zhao* 招 and *yao* 搖.¹³⁶ A dead tree is *ku* 枯¹³⁷ or *gao* 槁.¹³⁸ In this enumeration I have repeated some of the terms mentioned in the last chapter as being possible taxa for an initial attested classification of plants. The reason for this choice is that the status of the categories to which this vocabulary refers does not seem to be clearly defined. Nevertheless, whatever interpretation one might prefer, the importance of trees as beacons and landmarks in the landscape seems to me very possible, if not obvious. The enumeration above of a small proportion of terms relating to the plant world in this first Chinese

¹¹¹ Ding Fubao (1928, p. 376a).¹¹² Ding Fubao (1928, p. 377a).¹¹³ Ding Fubao (1928, p. 376b).¹¹⁴ In the *Shuo wen jié zǐ*, *ou* is written with a different graph.¹¹⁵ Ding Fubao (1928, p. 2450b).¹¹⁶ Ding Fubao (1928, p. 2467b).¹¹⁷ Ding Fubao (1928, p. 229a).¹¹⁸ Ding Fubao (1928, p. 483b).¹¹⁹ Ding Fubao (1928, p. 475a).¹²⁰ Ding Fubao (1928, p. 286a).¹²¹ Ding Fubao (1928, p. 286b).¹²² Ding Fubao (1928, p. 231b).¹²³ Ding Fubao (1928, p. 3148b).¹²⁴ The *Shuo wen jié zǐ* classifies bamboo among the grasses, with the definition 'grass that grows in winter'.¹²⁵ Ding Fubao (1928, p. 481a).¹²⁶ Ding Fubao (1928, p. 475a).¹²⁷ Ding Fubao (1928, p. 2476b).¹²⁸ Ding Fubao (1928, p. 2461a).¹²⁹ Ding Fubao (1928, p. 2477b).¹³⁰ Ding Fubao (1928, p. 2470a).¹³¹ Ding Fubao (1928, p. 2467a).¹³² Ding Fubao (1928, p. 2471b).¹³³ Ding Fubao (1928, p. 4577b).¹³⁴ Ding Fubao (1928, p. 2469b).¹³⁵ Ding Fubao (1928, p. 2479a).¹³⁶ Ding Fubao (1928, p. 2468b).¹³⁷ Ding Fubao (1928, p. 2479b).¹³⁸ Ding Fubao (1928, p. 2481a).

dictionary indicates the importance of plants in the Chinese civilisation about 2,300 years ago and, above all, the author's concern with accuracy when he transcribed the terms used by those who were in contact with plants both wild and cultivated. This terminology, which refers us back to the writings of Edward Lee Greene, is valuable because, through the keen observation of the actors who created them, it reveals the cultural importance of details that may today seem insignificant but that are so many elements in what I would like to call a 'lexical archaeology' the analysis of which is bound to fuel reflection leading to future research.¹³⁹

(2) EXOTIC MONOGRAPHS

As well as dictionaries, texts dating from the 1st to the 6th centuries that describe the products of southern China, fortunately collected in a recent compilation,¹⁴⁰ make it possible to assess the use of descriptive botanical vocabulary within a practical context. The editors demonstrate the precision of the morphological details of these plants. The parts of them that are of economic interest, namely the fruits, are the object of particular attention. Here is a description of the coconut tree and its coconuts provided by the *Nan zhou yi wu zhi* 南州異物誌 by Wan Zhen 萬震,¹⁴¹ who lived in the Kingdom of Wu (+222–+282):

Three to four spans [in circumference], sixty feet tall, branchless. It can live for over one hundred years. The leaves are shaped like bracken and are ten or eleven feet long and they rise up into the sky. The fruit is among the leaves, as large as a *sheng* [a tenth of a bushel], surrounded by an external rind [that gives it] the shape of a lotus flower. Inside the rind [is] a hard stone. Inside this stone the flesh is as white as a hen's egg; it is covered by a skin but inside it is hollow and contains a juice; large ones contain over a litre. The shape of the fruit is either round or resembles a marrow;¹⁴² sliced laterally it serves as a cup or one can use it for [other] objects. People value them greatly.

Observation of another tree leads to a recognition of 'hairlike-roots', *fa gen* 髮根, that hang, like hair, from knots in the branches, while another text mentions 'hanging roots', *xuan gen* 懸根.

Many citations show that while the authors of monographs emphasise the useful parts in particular – essentially the fruit – the habit of the plant is also noted, as is the shape of the leaf. However, the inflorescence is seldom taken into account, except in the case of the *Areca catechu*, in which the unknown author of a *Yi wu zhi* 異物誌 notes that from a slit in the stem there emerges something that 'resembles an ear of millet, does not flower but produces fruits that are as large as peaches or plums'.¹⁴³

¹³⁹ I myself engaged in such an exercise in order to provide a glimpse of the wealth of information on the subject of bovines to be gained from considering the terms formed, using solely the key *niu* 牛. See Métaillé (2006a).

¹⁴⁰ Mou Qiyu and Qiu Zeqi (1990, esp. pp. 216 ff.).

¹⁴¹ Mou Qiyu and Qiu Zeqi (1990, p. 7).

¹⁴² The plant referred to is *Trichosanthes kirilowii* Maxim.

¹⁴³ Mou Qiyu and Qiu Zeqi (1990, p. 57).

A text of an encyclopaedic nature, the *Bo wu zhi* 博物志 (Compendium of Extensive Knowledge) by Zhang Hua 張華 (232–300), prompts me to qualify my approach to the description of plants in ancient texts and to point out that the perception of plants is not that of modern botanists. Taste, for example, may be a criterion of differentiation: ‘there are two kinds of chrysanthemum, the plants and flowers are identical, but the taste is rather different; the bitter one is not eaten’.¹⁴⁴ As the example of the lotus in the *Er ya* has clearly shown, the various parts of a plant may have specific names. Here are some other examples: *yuan zhi* 遠志:¹⁴⁵ ‘the shoot is called *xiao cao* 小草, the root is called *yuan zhi* 遠志’.¹⁴⁶ *Xiong qiong* 芎藭:¹⁴⁷ ‘the shoot is called *jiang li* 江離; the root is called *xiong qiong* 芎藭’.¹⁴⁸ A single plant may possess several names: *wu tou* 烏頭, *tian qiong* 天雄, *fu zi* 附子, [are] the same thing, they are differentiated according to whether they are gathered in the spring, the summer, the autumn or the winter’.¹⁴⁹

The ancient descriptive botanical vocabulary is to some extent revived in the monographs on southern regions mentioned above, as also in the *Qi min yao shu* – in the 6th century – which cites the texts of antiquity abundantly. In contrast, the texts on *materia medica* that are still known today are interested above all in the names and medicinal properties of the plants and provide practically no descriptions prior to the compilation of the *Ben cao tu jing* under the direction of Su Song (1061). But I should qualify that assertion: while descriptions are almost non-existent, a reading of the documents that have survived tells us that there were illustrated works, now lost. Tao Hongjing, in the preface to the *Shen nong ben cao jing ji zhu* (+492) notes the existence of a book entitled *Tong Jun cai yao lu* 桐君采藥錄 (Tong Jun’s Directions for Gathering Drug Plants) that described the flowers and the leaves and their shape and colour.¹⁵⁰ A little later, the preface to the *Ben cao tu jing* refers to two other works. In the first, completed in the Yong Wei period (650–6) which ushered in the reign of the Tang Emperor Gao Zong, ‘images and texts lent one another mutual support, the images showing form and colour, the texts explaining similarities and differences’.¹⁵¹ By 1060, only one *juan* had survived from the second text, which dated from the Tian Bao period (742–56), but it revealed to the authors of the preface of the *Ben cao tu jing* a book ‘the contents of which were roughly arranged with no in-depth research’. The task of the authors of the *Ben cao tu jing* had been assigned to them by an imperial decree in the tenth moon of the third year of the Jia Yu period

¹⁴⁴ *Ju hua you er zhong, miao hua ru yi, wei wei xiao yi* 菊花有二種,苗花如一,唯味小異 in Fan Ning (1980, p. 48, n. 148).

¹⁴⁵ *Polygala tenuifolia* Wild. Jia Zuzhang and Jia Zushan (1955, Fig. 0882).

¹⁴⁶ In Fan Ning (1980, p. 47, no 146).

¹⁴⁷ *Conioselinum unvittatum* Turcz. Jia Zuzhang and Jia Zushan (1955, Fig. 0260).

¹⁴⁸ In Fan Ning (1980, p. 47, no 147).

¹⁴⁹ *Wu tou, tian xiong, fu zi, yi wu, chun qiu dong xia cai ge yi ye* 烏頭,天雄,附子,一物,春秋冬夏採各異也, in Fan Ning (1980, p. 47, no 145). The plant to which all the names refer is the Chinese aconite, *Aconitum sinense* Sieb.; Jia Zuzhang and Jia Zushan (1955, Fig. 1386). In another, later, text, the *Gui xin za zhi* 癸辛雜誌 by Zhou Mi 周密 (end of the 13th century), the three terms correspond to the plant at different moments in its growth: *fu zi* at three years, *wu tou* at four years and *tian xiong* at five years. See SCC Volume 6, Part 1, p. 489.

¹⁵⁰ Cf SCC Volume 6, Part 1, p. 245.

¹⁵¹ Okanishi Tameto (1969, p. 1216).



Fig. 11. Detail from a stele of the Tang period, from a rubbing bought by the author in 1965 at Luoyang Museum (author's photo).

(1058). They were to produce a revision of the pharmacopoeia on the basis of existing texts and produce a work with illustrations and commentaries. They were to make a minute study of

the form, colour, dimensions of the root, stem, shoot, leaf, flower and fruit. Do the same for animals and minerals.¹⁵² Add whatever was used as a drug. Draw every product and provide an individual explanation [indicating] flowering and fruiting, the period of harvesting, uses and effects. With regard to that which is produced in foreign lands, the order is to question merchants at the toll points, in markets and on ships in order to gain detailed information.¹⁵³

Before tackling the Song period, the engraving on a stele (Fig. 11) dating from the Tang dynasty (618–907) and found in the Luoyang region makes it possible, in the absence of any illustrations of *materia medica*, to assess the quality of botanical representation in a symbolic framework similar to that of earlier engravings of the Han period (see Figs. 9 and 10).

(3) THE DESCRIPTION AND ILLUSTRATION OF PLANTS UNDER THE SONG

How did the authors of the *Ben cao tu jing*, with their imperial orders, acquit themselves of their mission? The preface of the book, completed three years later (1061), provides a clear answer with regard to the role of Su Song:

We collected explanations and roughly classified them; we separated the names of minerals from those of plants and animals. In some cases a product is known everywhere; in some, the same term covers completely different realities: so then we used what had been said in

¹⁵² Literally, 'bugs, aquatic beings, birds and quadrupeds, jades and stones' (*chong yu niao shou yu shi* 蟲魚鳥獸玉石).

¹⁵³ Cf Okanishi Tameto (1969, p. 1217), translation by the present author.

both antiquity and our own period, gaining enlightenment from the comparison. [But as regards] the thickness of stems and roots, the appearance and falling of flowers and fruits, even if the ancient information is contradictory, we nevertheless preserved it. A general idea, even if vague, gleaned from ancient commentaries may make it possible to come to an understanding of a text. When the commentaries did not suffice, we searched further afield in canonical books, histories, notes made by literati, books on magic and medicinal recipes in order to find out the real nature of the object under consideration. If we [reckon] that *lu ying* 陸英 is [the same thing as] *shuo diao hua* 蒟蒻花, that is thanks to the [philological] explanations of the *Er ya*.¹⁵⁴ Given that all perfumes share a common basis, we used the *Ling biao lu yi* 嶺表錄異¹⁵⁵ to analyse that category of products. Where regions of provenance are concerned, our source of reference was the [*Sheng nong*] *Ben [cao] jing*, contemporary information coming in second place. In the case of dodder, for example, we note that it originated in Korea but nowadays it comes from Yuan-qi¹⁵⁶ ... When there are discrepancies about the part used or the harvesting period, we have preserved all the conflicting commentaries. On *chi jian* 赤簡,¹⁵⁷ the [*Shen nong*] *Ben [cao] jing* notes that only the root is harvested, but these days the stem and the young shoot are also collected. As for what comes from foreign lands, we noted what is said nowadays and also what is reported in books ... The three ranks are noted from the [*Sheng nong*] *Ben [cao] jing*. Where the nature and category [of two products] are close and one of them is not well known, or for [products] from faraway places, if their aspect is unknown, we have annexed the commentary to another rubric. That is so in the case of *sou shu* 搜疏,¹⁵⁸ which is annexed to *gou qi* 枸杞¹⁵⁹ ...¹⁶⁰

None of the 917 original illustrations that accompany the rubrics devoted to 632 drugs are known today. However, a number of Japanese manuscripts dating from the 11th and 12th centuries, which were used in the teaching of esoteric Buddhism, incorporate drawings of plants and animals that attest to the style of

¹⁵⁴ These two terms are today also considered to be synonymous by Chinese botanists, and they designate an elder tree, the Chinese elder, *Sambucus chinensis* Lindl. Anon. (1972–6, Volume 4, p. 322). Read (1936, pp. 19–20), following Li Shizhen, identified each term with a different species: *lu ying* with *S. javanica* Bl. and *shuo tiao* with *S. thunbergiana* Bl. The numerous cases of synonyms in the scholarly Latin nomenclature testify to the difficulty in differentiating precisely between the Chinese species of the elder tree. Here is Su Song's view of the matter: 'According to the *Ben cao*, *lu ying* grows in the valleys of the Xionger mountains and in Yuanqu. There is no indication of the provenance of the *shuo tiao*, but it is said that it grows in the countryside, where it is still to be found today. In the springtime it produces shoots; the stems have knots and the branches grow in between the knots; the leaves are as large as those of the *shui qin* [*Oenanthe stolonifera* DC.]. In the spring and the summer, the leaves are picked; the root and the stem are gathered in the autumn and the winter. Tao [Hongjing] and Su [Gong] consider that they are the same plant. Ma Zhi [principal editor of the *Kai bao [xin xiang ding] ben cao* (+973)], considering the differences in their natures (*xing*) and their tastes (*wèi*), doubts that they belong to the same kind (*zhong*), but without being able to differentiate precisely between them. However, the *Er ya* [states]: "for trees one speaks of flowering (*hua*), [for] grasses one speaks of flowering (*rong*), for that which does not flower (*rong*) but does produce fruits one says *xin*, for that which flowers (*rong*) and does not produce fruits, one says *ying*. As the name of this plant contains *ying*, there is a reference expressly to the flower. That is why the text of the *Ben jing*, 'gather for *li qiu*' [the two weeks starting on 8 August], precisely indicates the period of flowering".

¹⁵⁵ A work composed between +895 and +915 by Liu Xun and devoted to specific products of Guangdong. See *SCC* Volume 6, Part 1, pp. 459 and 532. See also Schafer (1970, pp. 25–54).

¹⁵⁶ Region situated to the north-west of present-day Caoxian in Shandong.

¹⁵⁷ *Gastrodia elata* Bl. A saprophyte orchid, see Fèvre and Métaillé (2005, p. 447).

¹⁵⁸ *Deutzia scabra* Thunb.; Read (1936, Fig. 466), Jia Zuzhang and Jia Zushan (1955, Fig. 1196).

¹⁵⁹ *Lycium chinense* Mill.

¹⁶⁰ See Okanishi Tameto (1969, pp. 1216–17). The work is also presented in Unschuld (1986, pp. 67–8). English version of author's translation.

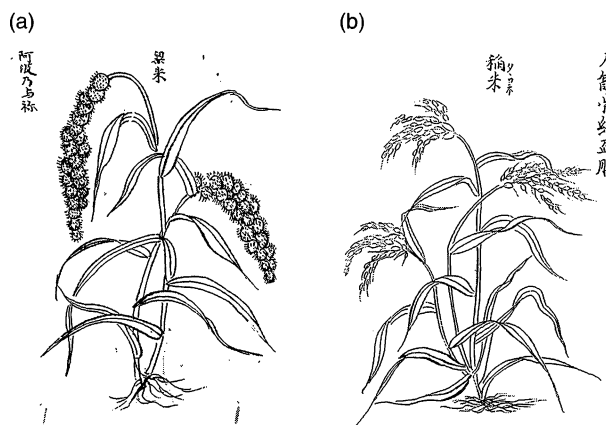


Fig. 12 (a) Foxtail millet (*Setaria italica* (L.) Beauv.), from a Japanese manuscript dated 1156, *Kokurui shō*, quoting the text from *Ben cao tu jing* (1061), from anon. (2004, p. 68); (b) rice (*Oryza sativa* L.), from a Japanese manuscript dated 1156, *Kokurui shō*, quoting the text from *Ben cao tu jing* (1061), from anon. (2004, p. 102).

such illustrations and provide elements for comparison with later illustrated works (see Fig. 12a, b). After a reading of the above account of the method of work, what is said about the lotus gives one a sense of the quality of the composition of the final text.¹⁶¹

The lotus grows in the ponds and marshes of Ru-nan.¹⁶² Today, it is to be found everywhere. It grows in the water. The name of its leaf is *he* according to the *Er ya* whereas the Commentaries [to the *Shi jing*] by Lu Ji say that the *he* is the *fu qu*: the people of Jiang-dong call it *he*, its stem *jia*, its leaf *xia*; its base *mi* is the root *ruo*, which is white beneath the stem, which is what is in the mud. The leaf, when it is not yet open, is [called] *han dan*, and once opened up, *fu rong*. Its fruit is *lian*; *lian* designates [the receptacle] *fang*. Its root is *ou*, the people of Yuzhou call it *guang pang* 光旁: once it has plunged deep, it grows until it is the size of a human arm. 'What is inside is *di*', which designates the fruits in the receptacle: the skin is dark green, the seed black. Inside [the seed] that which is two *fen* long is *yi*, which is what is bitter, at the heart [of the seed]. All these various products are today used as medicaments . . . The [summit-support of the leaf stalk] *di* at the centre of the leaf is called 'the nose of the lotus' (*he bi* 荷鼻) . . . When the autumn arrives, the external skin (*biao pi* 表皮) of the seed (*di*) turns black and the seeds sink into the water: they are then called 'stone-seed of the lotus' (*shi lian* 石蓮) . . .

Therapeutic instructions, which I shall not translate at this point, accompany these morphological notes. When comparing the above with the description of the lotus in the *Er ya* and with Guo Pu's commentary,¹⁶³ one is struck by the great similarity. The fact is that Su Song has essentially taken over the text of the *Er ya* and its commentary without distinguishing between the two and complementing them with contemporary notes which, in this way, enrich the traditional knowledge and bring

¹⁶¹ Translation of the passage cited in *juan* 23, in the 1249 edition of the *Chong xiu zheng he jing shi zheng lei bei yong ben cao*. (See Beijing: Tang Shenwei, 1957, p. 461.) English version of author's translation.

¹⁶² Region to the south-east of present-day Henan.

¹⁶³ See *SCC* Volume 6, Part 1, pp. 134–5.

it up to date. The abundance of terms for the various parts of the lotus certainly reflects the interest aroused possibly as early as antiquity, both by the morphological particularities of this plant and by the functions that were attributed to them: they had economic uses, to be sure, as is attested by the medicinal and nutritional uses indicated in the *ben cao*, but also aesthetic ones, for the *Ben cao yan yi* (1119) by Kou Zongshi refers to the existence of varieties of lotus with double flowers, either white or pink, and this text adds that these plants do not produce fruits. All the same, it is surprising that no description of the flower is given. That is not the case with the peony shrubs, *mu dan* 牡丹. The text of the *Ben cao tu jing*,¹⁶⁴ when describing wild peonies, reports that ‘at the third moon, they flower; the leaves of the flowers [petals] resemble those that people cultivate but the flowers have no more than five or six leaves [petals]’. The flowers are likewise taken into consideration in order to differentiate between chrysanthemums. The descriptions mention *rui* 蕊 or *hua rui* 花蕊 that are yellow, as distinct from other *hua* 花; *hua ban* 花瓣 is also mentioned. To sum up, when parts of the flower are considered in the *ben cao*, a distinction is drawn between *hua*, which designates the corolla, *hua ye* 花葉; *hua ban*, which designate the petals; and *rui*, *hua rui*. In a supplement to the *Shuo wen jie zi*, Ding Fubao records the *Guang yun* dictionary’s definition of *rui*:¹⁶⁵ ‘the exterior of the flower is called *e*, the interior of the flower is called *rui*’, *hua wai yue e hua nei yue rui* 花外曰萼花內曰蕊.¹⁶⁶ He concludes that these two characteristics must originally have appeared in the *Shuo wen*. This definition is repeated and completed by Hong Xingzu 洪興祖 (1131–61), in a commentary on the *Li sao*: ‘the exterior of the flower is called *e*, the interior of the flower is called *rui*; *rui* are the little tips at the top of the barbs [the filament of stamens] of the flower’ . . . *rui hua xu tou dian ye* 蕊花鬚頭點也.¹⁶⁷ This term, which is also to be found in Ouyang Xiu’s descriptions of certain peonies, thus designates the yellow parts inside the petals. In the case of chrysanthemums it refers to stigmas, in the case of peonies to the anthers at the top of the stamens. This is a case where the vocabulary relating to the flower has been enriched, no doubt because of the great interest shown by keen connoisseurs in the slightest details that enabled new horticultural varieties to be defined.

Upon reading the various other *ben cao* published under the Song, one notices the great number of citations drawn from earlier works, which in fact form the actual text. The originality of the compilers lay in the arrangement and the choice of those citations, among which those from the *Ben cao tu jing* represent the most significant and may occupy the greater part of the printed surface for a particular rubric. It seems logical to suppose that the compilers behaved with regard to illustrations in

¹⁶⁴ According to the citation in the 1249 edition of the *Zheng lei ben cao*. See Tang Shenwei (1957, p. 227).

¹⁶⁵ Dictionary of characters compiled under the direction of Chen Pengnian 陳彭年 and Qiu Yong 邱雍 and published in 1008 under the name of *Da Song chong xiu guang yun* 大宋重修廣韻.

¹⁶⁶ Ding Fubao (1928, p. 6780b).

¹⁶⁷ Cited in Tan Bi'an (1956, p. 437). The interpretation of *rui* in the text of the *Li sao* has given rise to numerous variants. Alongside this, which identifies it as ‘anther’, the *Zhong hua da zi dian* 中華大字典 makes it a synonym of *shi*, ‘fructification’, and another dictionary, the *Ci yuan* 辭源, indicates ‘heart of the flower’.

the same way that they did with regard to texts, and we may well wonder if the various engravings presented in *ben cao* later than the *Ben cao tu jing* were not inspired by the plates that figured in that book and that were created in the conditions that have been described earlier, rather than copied from nature. That is a hypothesis that is sometimes regarded as self-evident.¹⁶⁸ In order to try to provide an answer to this question, I shall now compare the plates that figure in the following four works: *Da guan ben cao* 大觀本草,¹⁶⁹ two editions of the *Zheng lei ben cao*,¹⁷⁰ and the *Shao xing ben cao* 紹興本草,¹⁷¹ even though I am aware that the number of plates varies from one to another, with respectively 922, 933 and 801 illustrations.¹⁷² Let us start with the lotus, whose descriptions I have just cited (see Figs. 13, 14). *Da guan ben cao* and *Shao xing ben cao* offer representations that are very decorative and are all built on a similar structure, while the engravings in the two editions of the *Zheng lei ben cao* are conceived quite differently. From the point of view of the fidelity of the representation, it is the drawing in the *Shao xing ben cao* that is the most lifelike, particularly in the details of the leaves and flowers. Nevertheless, the more schematic aspect of the engraving in the first edition of the *Zheng lei ben cao* does provide good botanical information as to both the habit of the plant and details of its root system and its flower. Now let us consider the convolvulus (Fig. 15). The structure of the representations of the *xuan hua* 旋花¹⁷³ is remarkably similar in all four sources, with the same number of open flowers and with the buds positioned in the same way on a stem that twists in the same manner except at the extreme tip, which turns to the left in the *Da guan ben cao* and the *Shao xing ben cao* and to the right in the two other cases. The whole leaves of the plant are clearly represented only in the *Shao xing ben cao* and the *Zheng lei ben cao*. In the *Da guan ben cao*, except for two leaves that appear to be complete and triangular in shape, the rest of the leaves are represented as composite; in fact the two lower lobes have been interpreted by the engravers as separate small leaves. Yet the text notes implicitly that the leaves are whole as 'they have three pointed tips'. For the flowers, the *Zheng lei ben cao* and the *Shao xing ben cao* are the ones that offer the best reproductions, as those of the two other books are more schematic. If we now consider another convolvulus, *qian niu zi* 牽牛子 (Fig. 16),¹⁷⁴ we find that the representations differ greatly. In the *Da guan ben cao* the engraver's interest has concentrated essentially on the details of the fruit; in the *Shao xing ben cao*,

¹⁶⁸ Liu Dapei and Shang Zhijun (1994, p. 46).

¹⁶⁹ The complete title is *Jing shi zheng lei da guan ben cao* 經史證類大觀本草. I have used the Japanese edition edited by Kimura Koichi and Yosizaki Masao (1970), based on the Chinese edition of 1904, produced by Ge Fengshi. This edition is based on a 1215 text (derived from the table produced by Kimura Koichi, in Kimura Koichi and Yosizaki Masao (1970, p. xxii)).

¹⁷⁰ The full title is *Chong xiu zheng he jing shi zheng lei bei yong ben cao* 重修政和經史證類備用本草. I have used on the one hand the 1957 edition of Renmin weisheng chubanshe, which reproduces a 1249 edition, and, on the other, another edition dated 1577, which is preserved in the library of the Needham Research Institute in Cambridge.

¹⁷¹ The full title is *Shao Xing xiao ding jing shi zheng lei bei ji ben cao* 紹興校訂經史證類備記本草. The work that I used is a facsimile edition of a manuscript copy preserved in Japan, in the library of the Ryūkoku University, of the 1159 edition, which no longer exists.

¹⁷² Liu Dapei and Sheng Zhijun (1994, p. 46).

¹⁷³ *Calystegia sepium* (L.) Br.; anon. (1977b, Fig. 4604).

¹⁷⁴ *Pharbitis nil* (L.) Choisy; anon. (1977b, Fig. 3365).

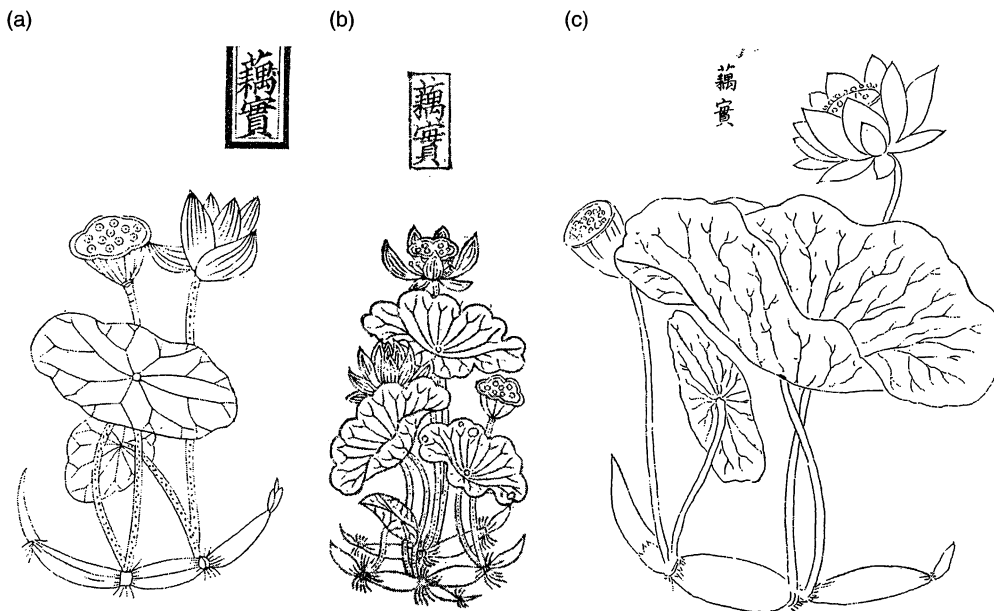


Fig. 13. Lotus (*ou* 藕), in the first two editions of the *Zheng lei ben cao*: (a) *Jing shi zheng lei da guan ben cao* 經史證類大觀本草 (1108, *juan* 23, *guo bu* 果部 2b), from Kimura Koichi and Yosizaki Masao (1970, p. 508); (b) *Chong xiu zheng he jing shi zheng lei bei yong ben cao* 重修政和經史證類備用本草 (1249, *juan* 23), from Tang Shenwei (1957, p. 460), as well as in the manuscript; (c) *Shao Xing xiao ding jing shi zheng lei bei ji ben cao* 紹興校訂經史證類備記本草 (1159), from Okanishi (1971, Volume 6, *juan* 24). Compare with Fig. 31.



Fig. 14 Lotus (*ou* 藕), from *Er ya tu* (1883, *shi cao*, p. 22a).

(a)



(b1)



(b2)

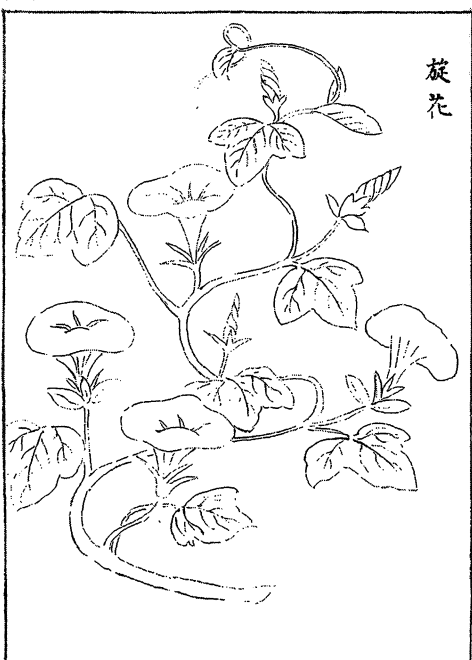


Fig. 15. Bindweed (*xuan hua* 旋花), in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 7, *cao bu* 草部, 37a, b), from Kimura Koichi and Yosizaki Masao (1970, p. 194); (b1, b2) 1159, from Okanishi Tameto (1971, Volume 2, *juan* 8); (c) 1249 (*juan* 7, 27a), from Tang Shenwei (1957, p. 185); (d) 1468 (*juan* 7, 31a).



Fig. 15. (cont.)

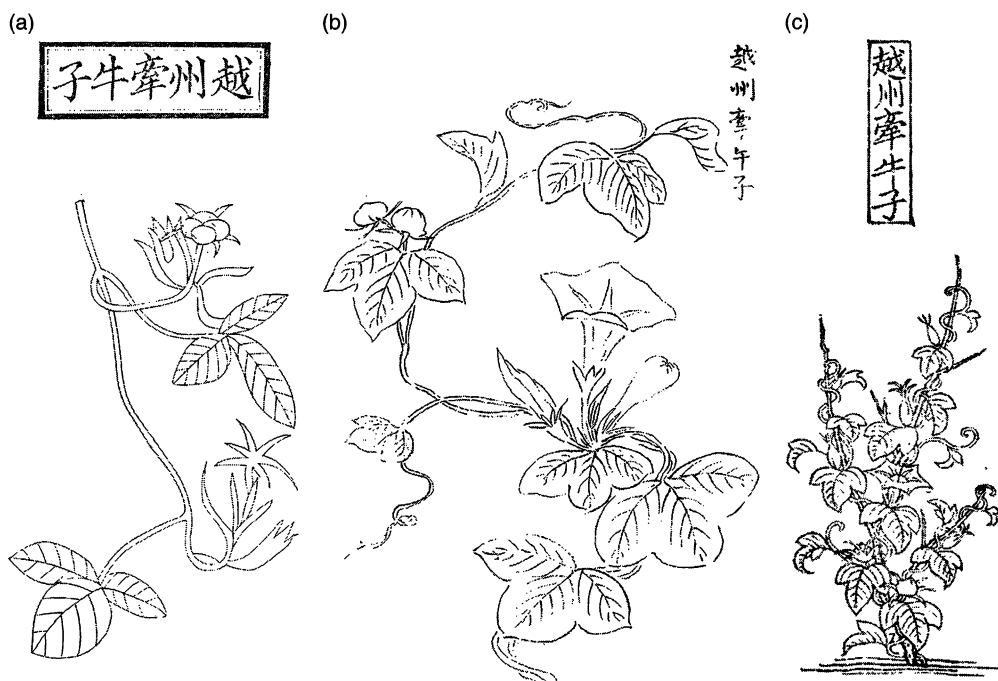


Fig. 16. Japanese morning glory (*qian niu zi* 牽牛子), in three editions of *Zheng lei ben cao*: (a) 1108 (*juan* 11, *cao bu* 草部, 7a), from Kimura Koichi and Yosizaki Masao (1970 p. 301); (b) 1159, from Okanishi Tameto (1971, Volume 3, *juan* 12); (c) 1249 (*juan* 11, 8a), from Tang Shenwei (1957, p. 264).

he concentrates more on the flower, while the *Zheng lei ben cao* presents an image of the whole plant complete with both its flower and its fruits. In the case of the *gua lou* 栝樓,¹⁷⁵ however, the representations of the plants are all similar and seem to indicate a common source (Fig. 17). For the *ma bian cao* 馬鞭草¹⁷⁶ (Fig. 18), vervain, although the number of leaves varies from one image to another, the structure of the inflorescence remains remarkably similar, suggesting that here, too, the different representations all have a common source. In the case of the dandelion, *pu gong cao* 蒲公英,¹⁷⁷ the engravings of the *Da guan ben cao* and the *Zheng lei ben cao* are very similar, while the drawing in the *Shao xing ben cao* differs from those both in the graphic details and in the better quality of the representation (Fig. 19). The two gleditschias, Chinese honey locust trees, *zao jia* 皂莢, that are represented pose an interesting problem, for none of the illustrations is altogether satisfactory. As regards solely the illustration, it is only in the *Shao xing ben cao* that the representation of the habit of these trees properly evokes Chinese honey locust trees with their compound penniform leaves (Fig. 20a, b). However, the artist has forgotten the thorns on the trunk, has seen imparipenniform leaves where the botanist sees paripenniform ones and the only difference between the two species of the trees is in the relative size of the leaves and the pods: the image does not allow for any precise botanical distinction between the two trees even if it is possible to recognise gleditschias. In the *Zheng lei ben cao* (Fig. 21a, b), it is the drawing of the pods – associated with the thorns of the trunk in one case – that makes one think of trees of this botanical genus even though the representation of the leaves is totally wrong. However, the juxtaposition of the two illustrations and the relevance of one detail that is represented make a precise botanical identification possible. *Zhu ya zao jia* 豬牙皂莢 (Fig. 21a, c), which has pods shaped like the tusks of a boar, as the Chinese name reminds one, is *Gleditschia officinalis* Hemsl.¹⁷⁸ *Zao jia* 皂莢 is *Gleditschia sinensis* Lam.¹⁷⁹ (Fig. 21d). In the *Da guan ben cao* (Fig. 21b), the guesswork is considerable and only the thorns on the trunk suggest that this is a gleditschia. The illustrations of vines, *pu tao* 葡萄¹⁸⁰ (Fig. 22), and of the chestnut tree, *li* 栗¹⁸¹ (Fig. 23), concentrate on the fruit, two bunches of grapes growing on a leafy branch on the one hand and, on the other, a chestnut tree branch showing a closed husk and a half-open one that reveals the chestnuts inside it, with another chestnut alongside. Despite small differences, these two series of illustrations are based on a similar structure. The

¹⁷⁵ To judge by the name, one of the two plants represented, that from Hengzhou, is probably *Trichosanthes kirilowii* Maxim. (Jia Zuzhang and Jia Zushan 1955, Fig. 0185), while the other, from Junzhou, seems to be *Trichosanthes cucumeroides* Maxim. My hypothesis is supported by the fact that this plant is today indicated by the term *jia gua lou* 假栝樓, 'false *gua lou*' (anon. 1972–6, Volume 4, p. 369), alongside *wang gua* 王瓜, the modern Chinese name. See Jia Zuzhang and Jia Zushan (1955, Fig. 0184).

¹⁷⁶ *Verbena officinalis* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0377).

¹⁷⁷ This is, without doubt, a *Taraxacum*, probably *T. mongolicum* Hand.-Mazz. (anon. 1972–6, Volume 4, p. 680).

¹⁷⁸ Anon. (1972–6, Volume 2, p. 345).

¹⁷⁹ Anon. (1972–6, Volume 2, p. 346), and Jia Zuzhang and Jia Zushan (1955, Fig. 0987).

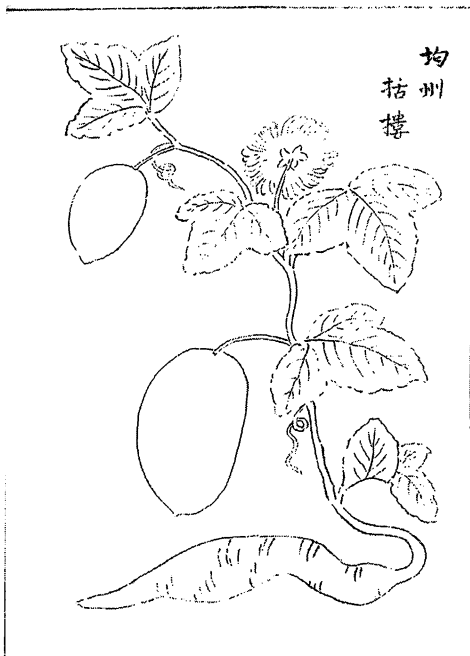
¹⁸⁰ *Vitis vinifera* L. Jia Zuzhang and Jia Zushan (1955, Fig. 0769).

¹⁸¹ *Castanea mollissima* Blume (= *C. bungeana* Bl.).

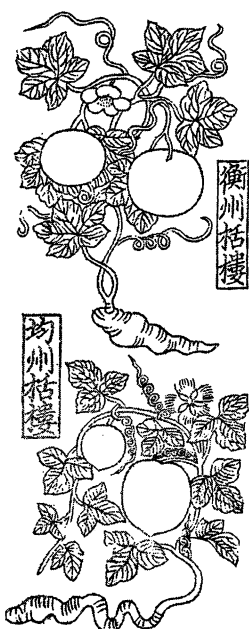
(b1)



(b2)



(c)



(d)

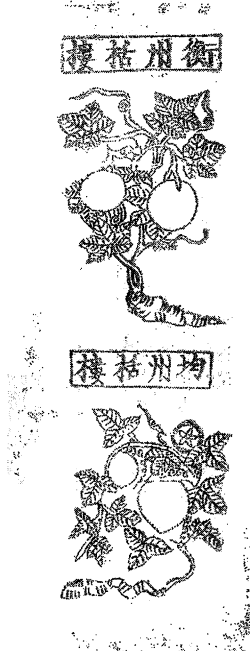


Fig. 17. (cont.)

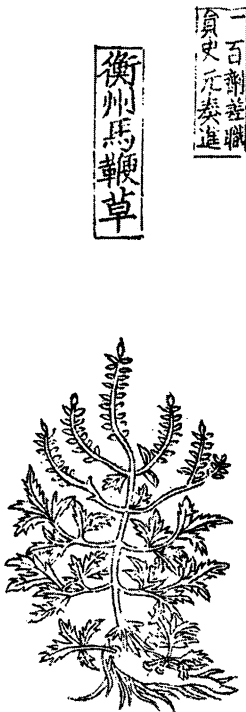
(a)



(b)



(c)



(d)



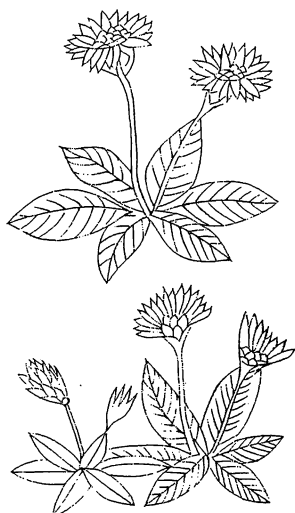
Fig. 18. Vervain (*Verbena officinalis*; *ma bian cao* 馬鞭草), in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 11, 18a), from Kimura Koichi and Yosizaki Masao (1970, p. 306); (b) 1159, from Okanishi Tameto (1971, Volume 3, *juan* 12 *shang*); (c) 1249 (*juan* 11, 18a), from Tang Shenwei (1957, p. 269); (d) 1468 (*juan* 11, 20a).

(a)

(b)

草公蒲

蒲公草



(c)

(d)



Fig. 19. Dandelion (*pu gong ying* 蒲公英), in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 11, 51a), from Kimura Koichi and Yosizaki Masao (1970, p. 323); (b) 1159, Okanishi Tameto (1971, Volume 3, *juan* 12 *xia*); (c) 1249 (*juan* 11, 42b), from Tang Shenwei (1957, p. 281); (d) 1468 (*juan* 11, 48a). Among the eight species mentioned in a modern Chinese flora (anon. 1972–6, Volume 4, p. 680) the illustrations of these two species (c) are closest to those shown in early engravings.

(e)

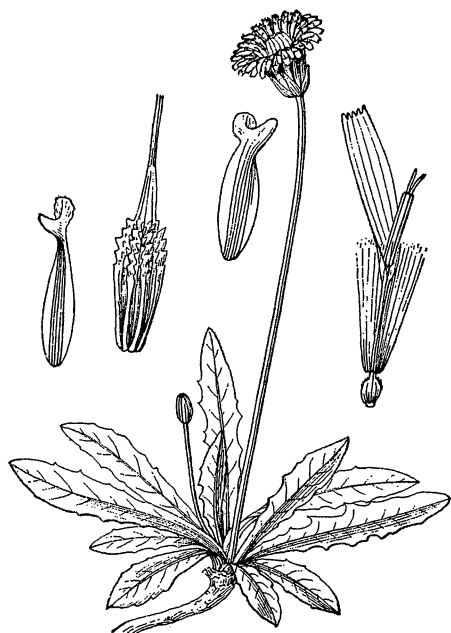


图 6773 (菊 科)

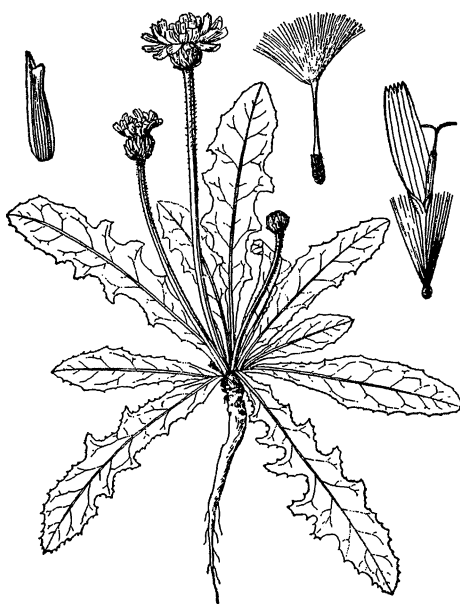


图 6774 (菊 科)

橡胶草 青胶蒲公英***Taraxacum kok-saghyz* Rodin**

多年生草本。根圆锥状，颈部被暗褐色残叶基。叶基生，莲座状平展，狭倒卵形或宽披针形，长2.5—10厘米，宽1—2厘米，钝或稍尖，基部渐狭，具波状齿，倒向羽裂或全缘，无毛。花葶数个，长9—15厘米。头状花序下面疏生短柔毛，直径2—2.5厘米；总苞长8—11毫米，淡绿色；总苞片2层，外层卵状披针形或披针形，顶端有明显的钩状下弯的小角，内层矩圆状条形，长约为外层的1.5倍，顶端有长而尖的小角；舌状花黄色。瘦果淡褐色，长约4毫米，有纵沟和尖的小瘤，喙长5—6毫米；冠毛白色。

新疆、甘肃、陕西、河北及黑龙江均有栽培；苏联中亚地区也有。生碱化草甸或沼泽地上。根多乳汁，可提取橡胶，用来制造一般橡胶制品。

蒲 公 英***Taraxacum mongolicum***

Hand.-Mazz.

多年生草本。根垂直。叶莲座状平展，矩圆状倒披针形或倒披针形，长5—15厘米，宽1—5.5厘米，羽状深裂，侧裂片4—5对，矩圆状披针形或三角形，具齿，顶裂片较大，戟状矩圆形，羽状浅裂或仅具波状齿，基部狭成短叶柄，被疏蛛丝状毛或几无毛。花葶数个，与叶多少等长，上端被密蛛丝状毛。总苞淡绿色，外层总苞片卵状披针形至披针形，边缘膜质，被白色长柔毛，顶端有或无小角，内层条状披针形，长于外层的1.5—2倍，顶端有小角；舌状花黄色。瘦果褐色，长4毫米，上半部有尖小瘤，喙长6—8毫米；冠毛白色。

广布于东北、华北、华东、华中、西北、西南；朝鲜，苏联也有。生田野、路旁。全草药用，有解毒清热等效。

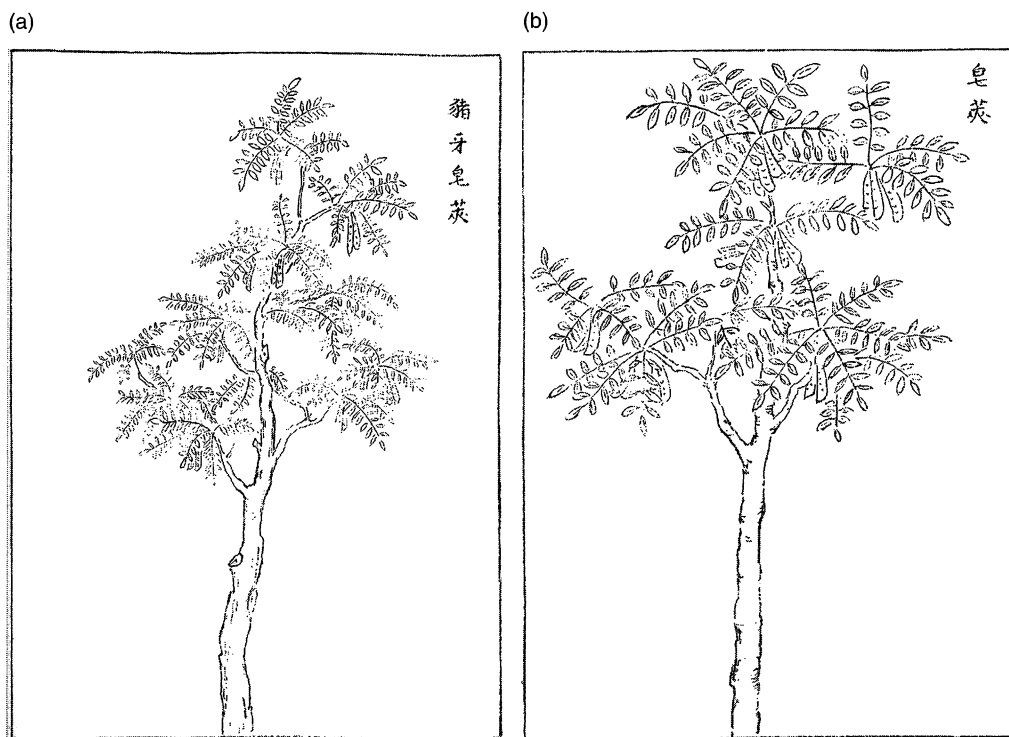


Fig. 20 (a, b). Chinese honey locust tree (*zao jia* 皂荚, *Gleditsia* sp.), in the 1159 manuscript of *Zheng lei ben cao*, from Okanishi Tameto (1971, Volume 4, *juan* 25 *shang*).

first edition of the *Ben cao gang mu* (1596) also provides a representation of a vine¹⁸² (Fig. 24) which does not bear any obvious resemblance to the engravings of the four other works, but presents a certain structural similarity with the 1249 edition. The fruits of liches, *li zhi* 荔枝¹⁸³ (Fig. 25), however, seem to be represented in a very similar manner, except that the image is reversed in the *Da guan ben cao* engraving. The engravings of the taro, *yu xing* 芋¹⁸⁴ (Fig. 26), in the two editions of the *Zheng lei ben cao* and that of the *Da guan ben cao* are very similar, whereas the drawing in the *Shao xing ben cao* differs appreciably in both the number and the disposition of the leaves and also in the appearance of the root. The same can be said of the various representations of the water caltrop or water chestnut, *ji shi* 芡實 (Fig. 27):¹⁸⁵ the drawing in the *Shao xing ben cao*, while respecting a similar construction, differs from the three others in that it is more precise, in particular with regard to the swelling of the leaf stalks – which enables these to float – which is well rendered, as are the

¹⁸² Nakamura Shōhachi, Tsukushima Hirosh and Ichizuka Harumichi (1990, p. 242).

¹⁸³ *Litchi sinensis* Sonn. (= *Nephelium litchi* Camb.).

¹⁸⁴ *Colocasia antiquorum* Schott. var. *esculenta* Schott. Jia Zuzhang and Jia Zushan (1955, Fig. 1926).

¹⁸⁵ *Trapa* sp. Given the size of the fruits, this is probably the *Trapa bicornis* Osbeck species. See anon. (1977b, Fig. 4100).

(a)



Fig. 21. Chinese honey locust tree (*zao jia* 皂荚, *Gleditschia* sp.), in two editions of *Zheng lei ben cao*: (a) 1249 (*juan* 14, 7a), from Tang Shenwei (1957, p. 341); (b) 1108 (*juan* 14, 5b, 6a), from Kimura Koichi and Yosizaki Masao (1970, p. 388). Two botanical species in a modern Chinese flora (anon. 1972–6): (c) *Gleditschia officinalis* Hemsl.; (d) *Gleditschia sinensis* Lam.

morphological details of the tubers. In the case of the opium poppy, *ying zi su* 罌子粟 (Fig. 28),¹⁸⁶ the contrast is even greater, for the capsule which, after all, is the referent for the Chinese name, is represented only in the *Shao xing ben cao*.

It is now possible to offer a few comments. The illustrations represent the plants, the sources of *materia medica*, but not the products themselves. If, as happens very rarely, alongside the image of a plant there is one of its parts, this is the fruit or seed, as in the case of *yu zhi zi* 預知子¹⁸⁷ (Fig. 29) or of the chestnut tree. This is probably not through any lack of a spirit of observation, but rather from a methodological choice. In the 13th century, indeed, an expert on Japanese apricot trees, Song Boren 宋伯仁, in the *Mei hua xi shen pu* 梅花喜神譜 (+1231) devoted himself, in 100 poems

¹⁸⁶ *Papaver somniferum* L. Jia Zuzhang and Jia Zushan (1955, Fig. 1311).

¹⁸⁷ Read (1936) was unable to identify this plant. Hu Shiu-ying (1980, p. 183) and Xu Guojun (1990, p. 460) think it is *Akebia quinata* (Thunb.) Decne. However, the description in the *Ben cao tu jing*, which mentions a leaf 'with three horns', suggests to me, rather, a variety of a close species, *Akebia trifoliata* (Thunb.) Koidz. var. *australis* (Diels) Rehd. (in anon. 1972–6, Volume 1, p. 756). Also, compare the engraving in the *Zheng lei ben cao* to the photograph in Xiao Peigen and Lian Wenyang (1988, Volume 1, p. 45).

(b)

[illegible]

皂莢

皂莢味辛鹹溫有小毒主風痺死肌邪氣風頭淚出利九竅殺精物養腰脹兩消穀除欬嗽囊結婦人胞不落明目益精可為沐藥不入湯生雍州川谷及魯鄆縣如猪牙者良九月十月採莢陰乾抱實者不使空參同圖經云今觀

章十四

一七〇

龜有長尺二者良俗人見其皆有蟲孔而不知其蟲欲飲黑便言不可近令人惡病殊不爾其蟲狀如草葉上青末微見蟲形皆言不可難免爾但取青莢生者看白如之唐本注云此物有三種猪牙所以藥散下其曲皮碎莢全無細潤跳脫不去其尺一寸猪牙大長虛而無間若長六寸五分圓厚節似直者及薄多肉味鹹大好治諸瘡等症按藥性論云皂莢燒灰燉酒中稍能腫胎又曰豬牙莢去脂內鹽煮其精火內煎之成膏塗常貼一切腫毒最能止癢痛風濕骨痛如早寒作高一日藥子云皂莢通關辟除頭風頭痛生刃南華呼如早寒作高一日藥子云皂莢通關辟除頭風清我疲勞專治胃弱脾開胃及中風口禁入藥去皮子以酥孟州者獨佳云良勝出雍州川谷及魯鄆縣今所在有之以饌孟州者衛生云長尺二者良唐汪公長六寸圓厚節似直者皮薄多肉味甘好合醫家用雖風氣輕烈多用長皂莢拾淘洗取淨用張猪牙者良治難病方效如指子以氣腫得些不得臥定九月三夜一服雞元末一物以蜜丸大如梧子以氣腫得些不得臥定九月三夜一服雞元海上方療腹脹滿欲更病者猪牙皂莢和湯服一丸日三夜一服雞元去脂子以蜜丸大如梧子以氣腫得些不得臥定九月三夜一服雞元口去脂子以蜜丸大如梧子以氣腫得些不得臥定九月三夜一服雞元若以內附節密丸大如梧子以氣腫得些不得臥定九月三夜一服雞元成者一月已不復食肉及諸般魚蟹又治熱勞以皂莢水浸一夜之不得令乾下竹乾蠶者如燕卵劉氏如以兩端每日空服飯前十五

Fig. 21. (*cont.*)

(c)

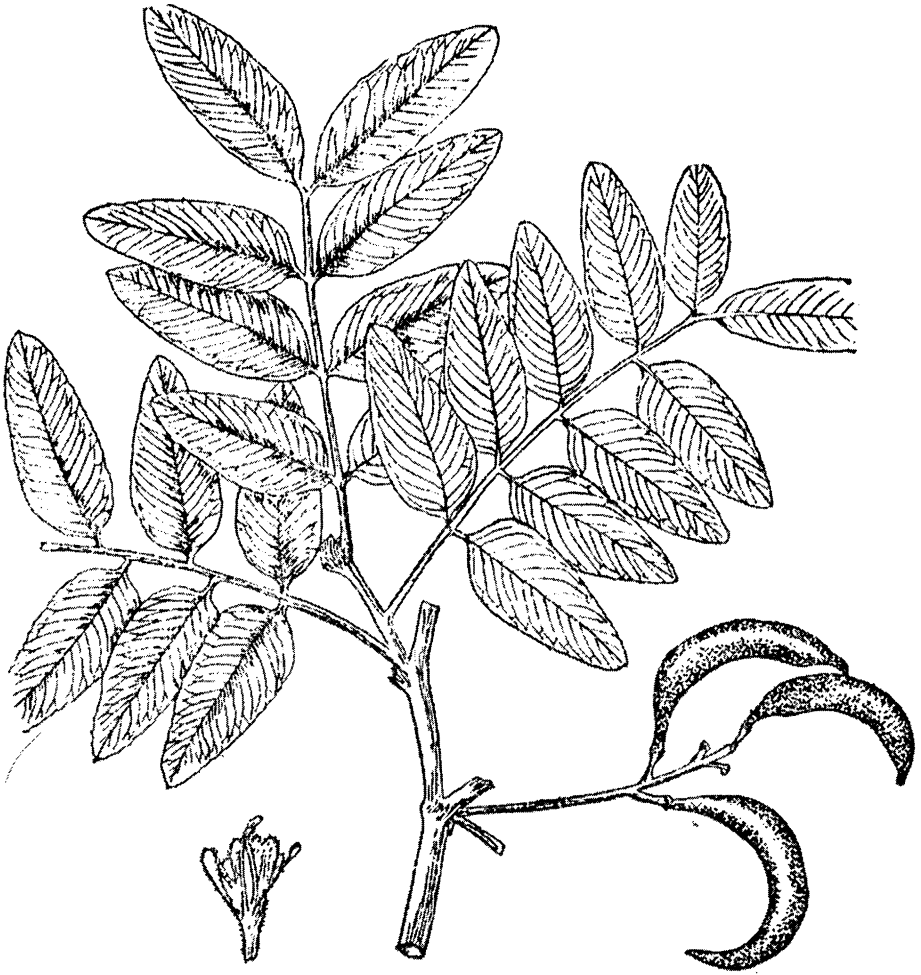


Fig. 21. (cont.)

and 100 drawings to a poetic evocation and representation of all the ‘states’ of the flower on a branch (Fig. 30), from the appearance of buds right through to the falling petals.¹⁸⁸ My second comment is this: with a few notable exceptions, the structure of the different representations of the same plant or part of that plant is

¹⁸⁸ It is a pity that, in this particular case, it is not possible to compare this collection with the illustrations of the *ben cao*. The fact is that while the flower is central to the preoccupations of the literati aesthetes, in *materia medica* only the fruit of the *Prunus mumei* Sieb. et Zucc. is taken into account. For a study of the plant in Chinese painting and literature, see Bickford (1985a). This work also contains an important bibliography on the subject. For a translation of Song Boren’s text, see Koehn (1947).

(d)

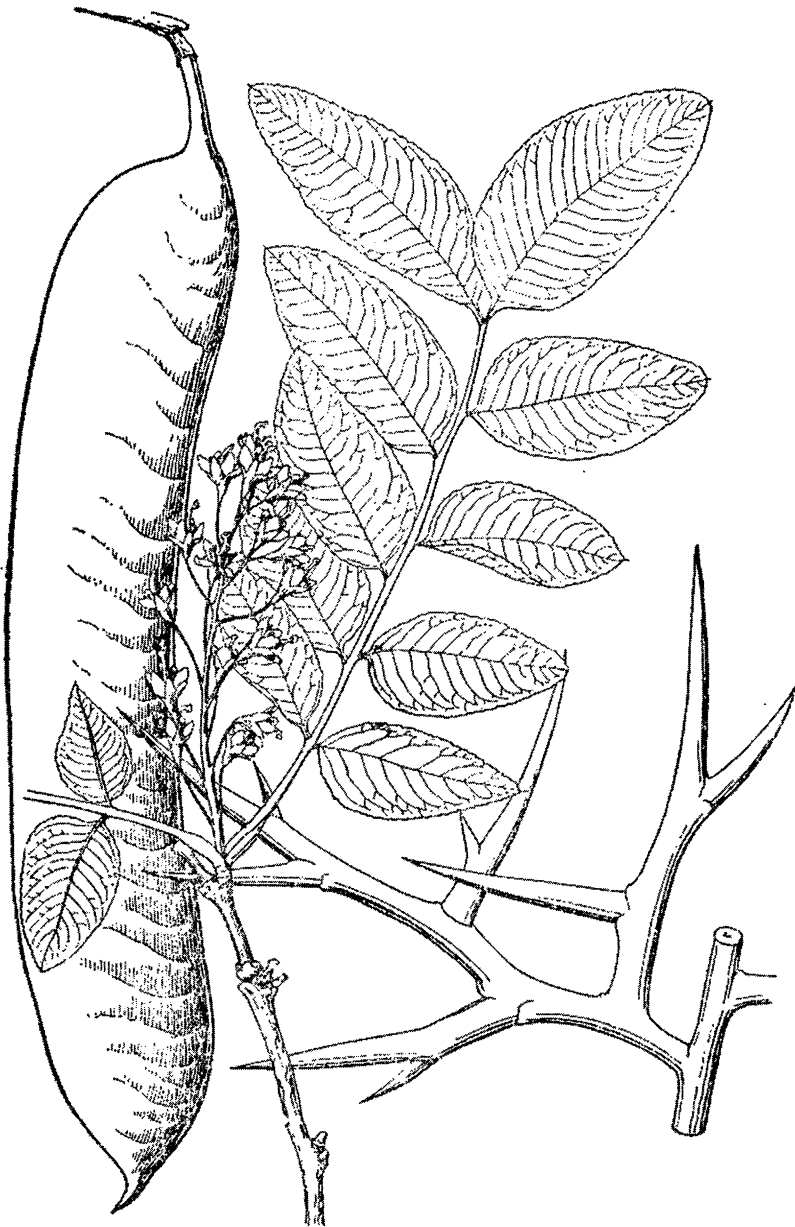


Fig. 21. (cont.)

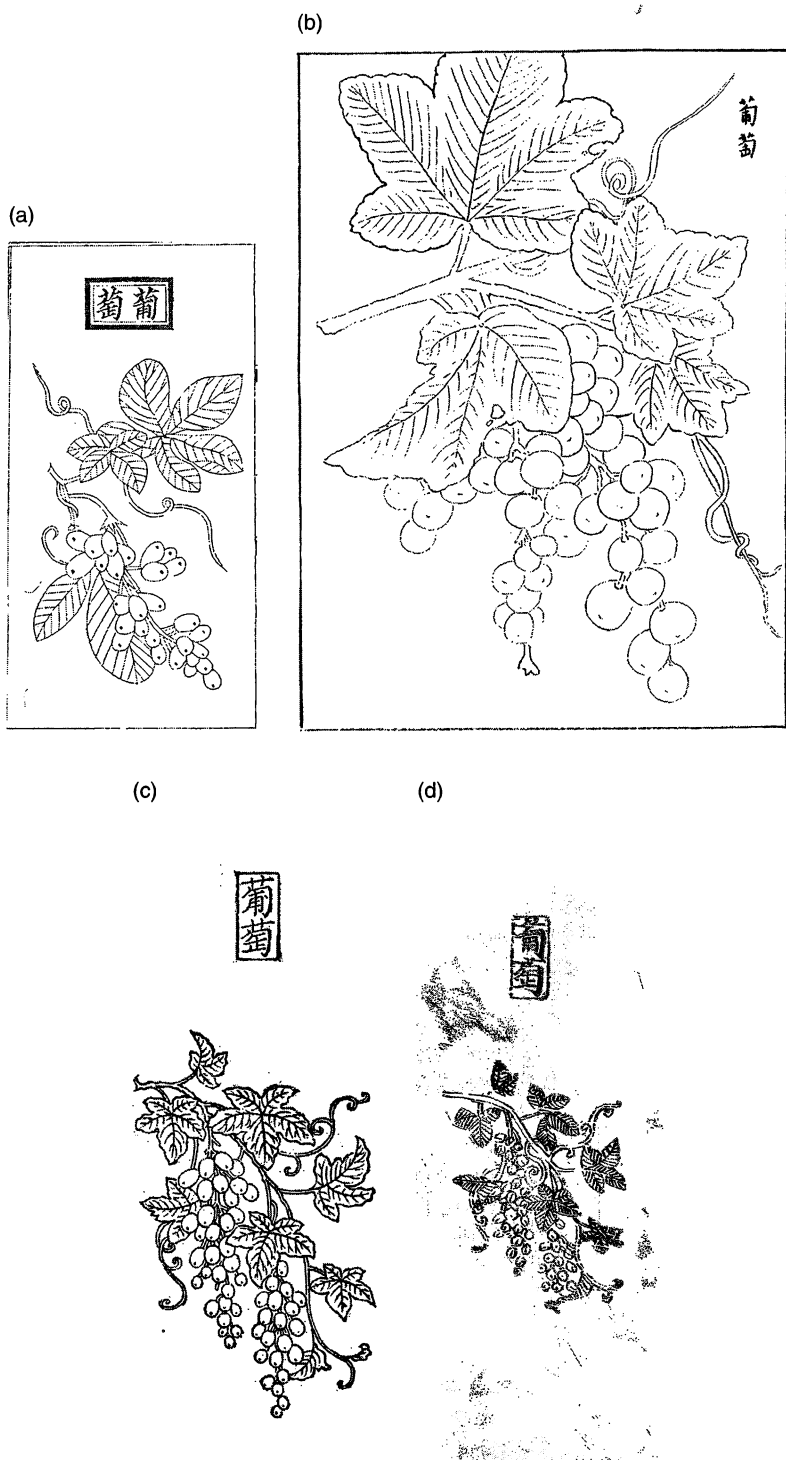


Fig. 22. Vine (*pu tao* 葡萄) represented in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 23, 10b), from Kimura Koichi and Yosizaki Masao (1970, p. 512); (b) 1159, from Okanishi Tameto (1971, Volume 6, *juan* 24 *shang*); (c) 1249 (*juan* 23, 9b), from Tang Shenwei (1957, p. 463); (d) 1468 (*juan* 23, 10b).

(a)



(b)



(c)



(d)



Fig. 23. Chestnut (*lǐ zǐ* 栗子), in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 23, 9a), from Kimura Koichi and Yosizaki Masao (1970, p. 512); (b) 1159, from Okanishi Tameto (1971, Volume 6, *juan* 24 *shang*); (c) 1249 (*juan* 23,

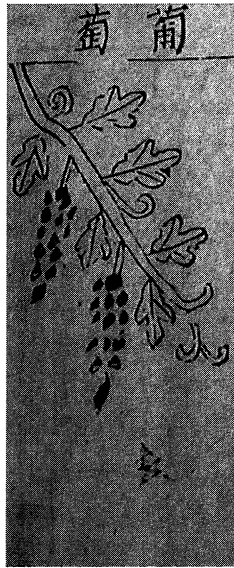


Fig. 24. Vine (*pu tao* 葡萄), in the first edition of *Ben cao gang mu* (1596, *fu tu juan zhi xia, guo bu luo lei fu tu* 附圖卷之下, 果部蔬類附圖, 15a). Cf Li Shizhen (1975–81, Volume 3, *fu tu*: p. 39).

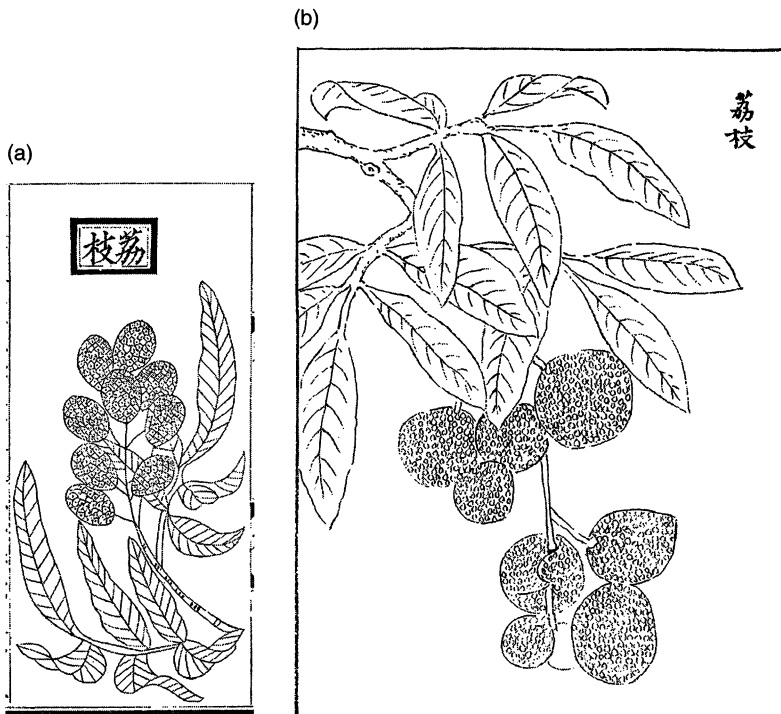


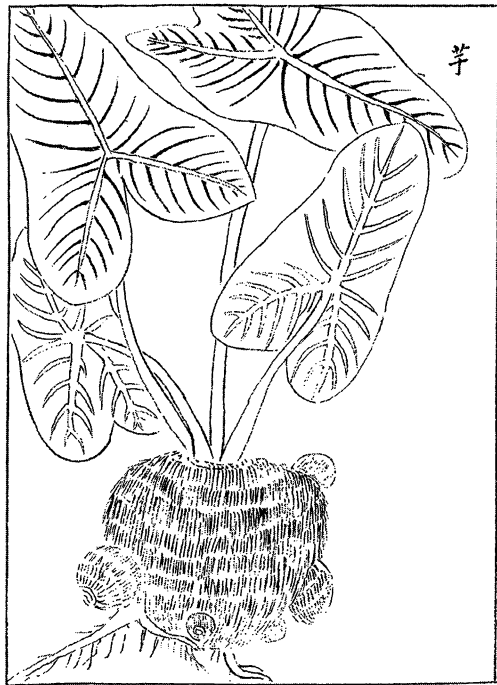
Fig. 25. Lichi (*li zhi* 荔枝), in three editions of *Zheng lei ben cao*: (a) 1108 (*juan* 23, 22b), from Kimura Koichi and Yosizaki Masao (1970, p. 518); (b) 1159, from Okanishi Tameto (1971, Volume 6, *juan* 24 *shang*); (c) 1249 (*juan* 23, 22a), from Tang Shenwei (1957, p. 470).

(c)



Fig. 25. (cont.)

(b)



(a)

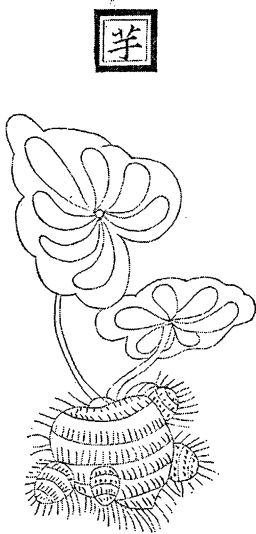


Fig. 26. Taro (*yu* 芋), in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 23, 19b), from Kimura Koichi and Yosizaki Masao (1970, p. 517); (b) 1159, from Okanishi Tameto (1971, Volume 6, *juan* 24 *shang*); (c) 1249 (*juan* 23, 19b), from Tang Shenwei (1957, p. 468); (d) 1468 (*juan* 23, 22b).

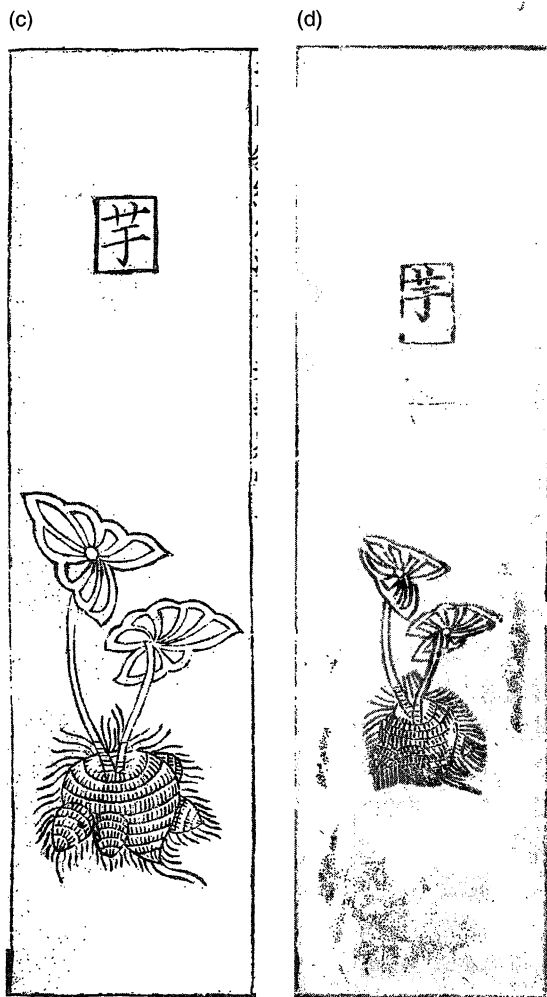


Fig. 26. (cont.)

very similar in all the various works.¹⁸⁹ It is clear that the illustrations of the 1249 edition of the *Zheng lei ben cao* served as a model for the second edition, which simply takes them over in a rougher version but not using the same engraved plates. If we now leave aside this later edition of the *Zheng lei ben cao*, certain details in the images of the three other works show that there can have been no mutual copying,¹⁹⁰

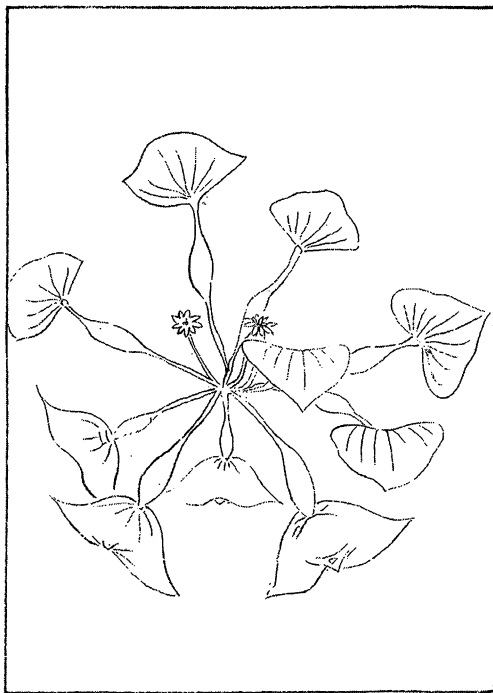
¹⁸⁹ For example, for the chestnut tree, the fold in the upper leaf on the right of the image (Fig. 23b); for vervain, the shape of the lower branch on the right of the image (Fig. 18). Nevertheless, assuming that the engravings of the contemporary edition of the *Er ya* (anon. 1883) do, as the preface claims, reproduce those of a Song edition, the date of which is not given, one can see, by comparing the representations of the lotus that have just been described (Fig. 13 and the one in the *Er ya* – see Fig. 14), that the similarity of the images concerns the various *ben cao*, but that is not the case for all the illustrated works.

¹⁹⁰ Where the representation of the convolvulus (*xuan hua*) is concerned (Fig. 15), the flower is represented more correctly in the 1249 edition of the *Zheng lei ben cao* than in that of the *Da guan ben cao*, so it cannot have been copied from the less accurate earlier edition. The same applies to the leaves of the vervain (Fig. 18) and also to the flowers of the *gua lou* (Fig. 17a and 17b).

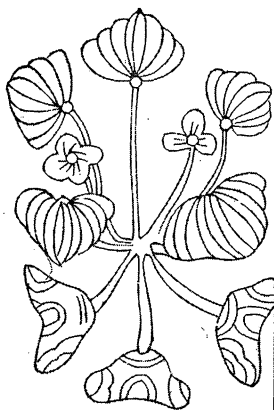
(a)



(b)



(c)



(d)

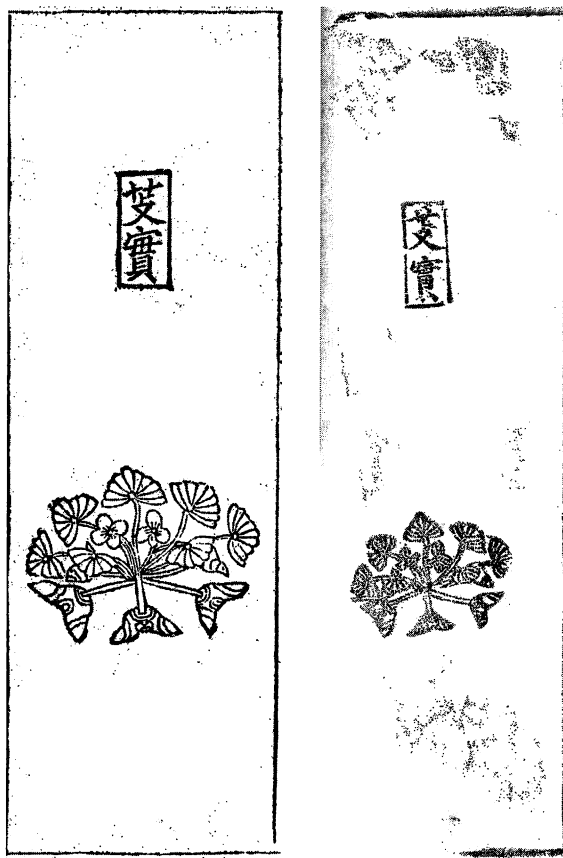
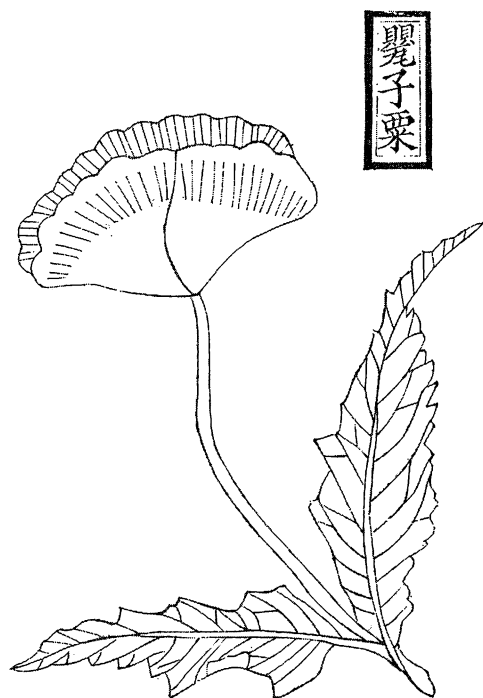


Fig. 27. Water caltrop (*ji* 芡), in four editions of *Zheng lei ben cao*: (a) 1108 (*juan* 23, 14b), from Kimura Koichi and Yosizaki Masao (1970, p. 514); (b) 1159, from Okanishi Tameto (1971, Volume 6, *juan* 24 *shang*); (c) 1249 (*juan* 23, 13a), from Tang Shenwei (1957, p. 465); (d) 1468 (*juan* 23, 14b).

(a)



(b)



Fig. 28. Opium poppy (*yīng zǐ sù* 罌子粟), in four editions of *Zhēng lei ben cao*: (a) 1108 (*juan* 26, 7b), from Kimura Koichi and Yosizaki Masao (1970, p. 546); (b) 1159, from Okanishi Tameto (1971, Volume 6, *juan* 25); (c) 1249 (*juan* 26, 7b), from Tang Shenwei (1957, p. 497); (d) 1468 (*juan* 26, 9a).

(c)



(d)



Fig. 28. (cont.)

(a)



(b)



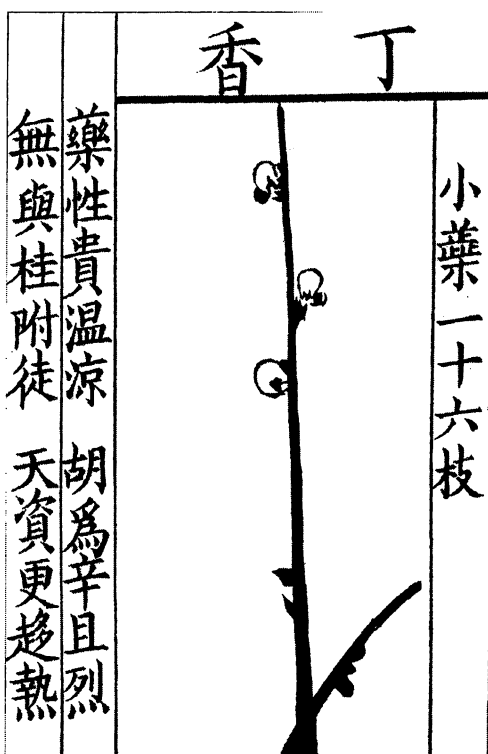
Fig. 29. *Yu zhi zi* 預知子 (*Akebia* sp.), from two editions of *Zheng lei ben cao*: (a) 1159, from Okanishi Tameto (1971, Volume 3, *juan* 12 *xia*); (b) 1249 (*juan* 11, 40a), from Tang Shenwei (1957, p. 280). At the base of the plant are illustrations of the opened fruit showing its seeds.

and so we must conclude that there must have been one common model, copied most faithfully in the drawings in the *Shao xing ben cao*. That model must, logically, have been the one provided by the iconography of the *Tu jing ben cao*. The few images to be found in the manuscript of the *Wu xing da yi* do not, however, make it possible to confirm that hypothesis absolutely. That hypothesis also raises the question of the reasons that may have persuaded the engravers of both the *Da guan ben cao* and the *Zheng lei ben cao* (Fig. 31a, b) to reduce the measurements of the representation of the sugar cane plant, as compared to the representation to be found in the *Shao xing ben cao* (Fig. 31c). Did the author of this manuscript preserved in Japan 'complete' the original because he found it inadequate? As for the relative graphic quality of the four works, the drawing strokes in the manuscript of the *Shao xing ben cao* are far more flowing than those in the woodcuts. That remark is even more apposite if one compares the engraved representations of lichis with the representation in the famous painting

(a)



(b)



(c)



(d)



Fig. 30. Japanese apricot (*Prunus mume* Sieb. et Zucc.) in four phases of its development, from *Mei hua xi shen pu* (1231) by Song Boren (1928): (a) 'crab's eye' (Volume 1, p. 2b); (b) 'clove' (Volume 1, p. 3a); (c) 'dragonfly wants to stand up' (Volume 2, p. 21a); (d) 'Meng Jia loses his hat' (Volume 2, p. 25a).

(a)

(b)

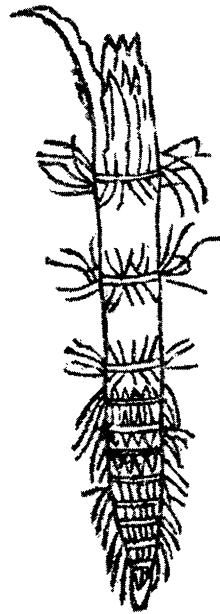
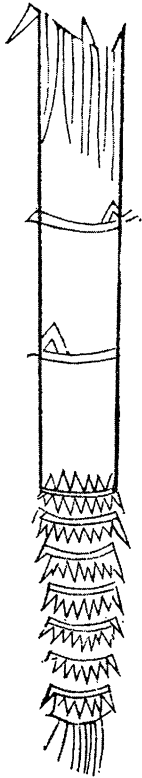


Fig. 31. Sugar cane (*gan zhe* 甘蔗) represented in the first two editions of *Zheng lei ben cao*: (a) 1108 (*juan* 23, 24a), from Kimura Koichi and Yosizaki Masao (1970, p. 519); (b) 1249 (*juan* 23, 24), from Tang Shenwei (1957, p. 471); and (c) in the manuscript dated 1159, from Okanishi Tameto (1971, Volume 6, *juan* 24 *shang*).

on silk attributed to the Song Emperor Hui Zong (1082–1135), although that is probably later (13th century) (Fig. 32).¹⁹¹

Now let us consider another remarkable work, the *Lü chan yan ben cao* 錄產言本草, completed in 1220 and recently brought to the attention of historians of science.¹⁹² Its author, Wang Jie 王介 (*hao* Shengyu 聖與, *zi* Moan 默庵), who held

¹⁹¹ See Hulton and Smith (1979, Fig. 27, opposite p. 70).

¹⁹² Zheng Jinsheng (1989).

(c)

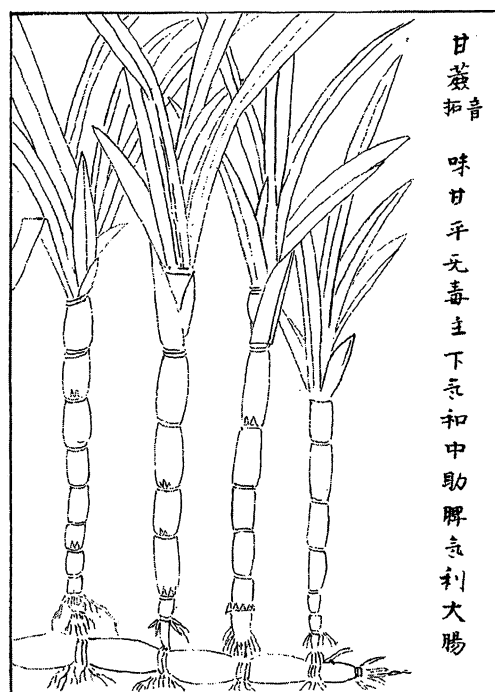
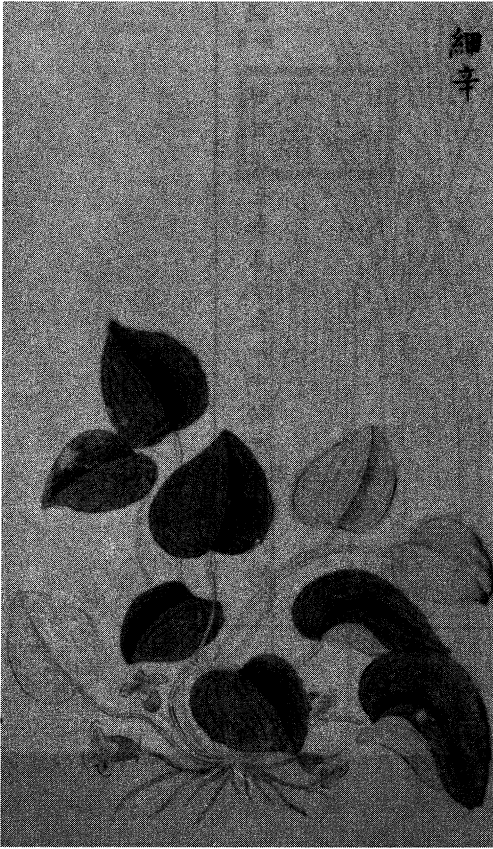


Fig. 31. (cont.)



Fig. 32. 'Common gardenia and lichi with birds', from a handscroll in ink and colours attributed to Emperor Hui Zong (1082–1135) (Hulton 1979, Plate 27). Compare with Fig. 197.

(a)



(b)



Fig. 33 (a) Wild ginger (*xi xin* 细辛; *Asarum* sp.), from *Lü chan yan ben cao* (1220), *juan shang* 卷上, n.p.; and (b) heavenly bamboo (*nan tian zhu* 南天竹, *Nandina domestica* Thunb., written here *nan tian zhu* 南天燭), from *Lü chan yan ben cao* (1220), *juan xia* 卷下, n.p.

administrative posts between 1195 and 1200, is also attested as a painter of plants, recognised for his talent in representing in particular the Japanese apricot tree, *mei* 梅, and the *Cymbidium*, *lan* 蘭, but he was not a doctor. Nevertheless, his work, of which only one copy dating from the Ming period survives, presents only plants of medicinal interest (206 in all) that grew in the Hangzhou region. The text merely repeats extracts from earlier *ben cao*, without adding any descriptions of the plants, which, however, are remarkably well drawn, probably from nature, and this makes it possible to identify a great number of them.¹⁹³ To be convinced of the truth of that assertion, one has only to look at the paintings of the *xi xin* 細辛¹⁹⁴ or the *nan tian zhu* 南天竹¹⁹⁵ (Fig. 33a,b). If the illustrations of the Ming book are faithful

¹⁹³ Only around forty of them can have failed to be recognised by Zheng Jinsheng before he investigated the terrain.

¹⁹⁴ *Asarum forbesii* Maxim., according to Zheng Jinsheng (1989).

¹⁹⁵ *Nandina domestica* Thunb.; Jia Zuzhang and Jia Zushan (1955, Fig. 1379).

reproductions of those in the original work, the plates in the *Lü chan yan ben cao* stand out for their originality and constitute, in Chinese pharmacological literature, a definite contrast to the many 'variations on a theme' that have been described above.

(4) THE DESCRIPTION AND ILLUSTRATION OF PLANTS UNDER THE MING

The next milestone in this glimpse of the history of the description and illustration of plants is provided by the famous *Jiu huang ben cao* 救荒本草 (Treatise on Wild Food Plants for Use in Emergency) by the Prince Zhu Xiao 朱橚, published in 1406.¹⁹⁶ Today, no copy of this first edition is known to exist. The most ancient copies that survive date from 1525.¹⁹⁷ This text is particularly interesting for our inquiry since its aims are eminently practical,¹⁹⁸ and of the 414 plants mentioned 276 are 'newly added', while the 138 others are already to be found in ancient *ben cao*. For each of the edible wild plants, the book provides a graphic representation accompanied by a description of the pharmacological properties and an indication of how to make use of one or more parts. Each plant is described in fewer than eighty characters, according to a systematic schema. The fullest descriptions indicate, successively, the region of origin (if there is a particular one), the ecology of the plant, its morphology (beginning with its height), the characteristics of its stem and leaves (shape, colour), its flower and its fruit. A few examples will show how the author worked. Let us begin with the sesame plant, *you zi miao* 油子苗¹⁹⁹ (Fig. 34a):

In the *Ben cao* there is *bai you ma* 白油麻. The popular name is *zhi ma* 脂麻. In the past the region from which it came was not indicated. Today it is everywhere. People sow a lot of it in their gardens. The plant is three or four feet tall, the stem is square. Its surface is hollowed out and [there are] four edges; the branches form opposite ramifications at the nodes. The leaf is of the same kind as that of the *shiso*²⁰⁰ but longer, with a pointed tip and a very scalloped edge. White flowers open between the leaves. Capsules (*shuo* 蒴) with four sharp edges form, each containing between forty and fifty seeds. Their taste is sweet, slightly bitter. When raw, their nature is very cold, non-toxic; once roasted their nature is hot. Once they are pressed, one can make an oil the nature of which is very cold.

The quality of the illustration is comparable to that of the *Zheng lei ben cao* of 1249 (see Fig. 34 b). As for the text, it seems to be a condensation of various citations from authors mentioned in the seeds section, *mi gu bu*, in the *Zheng lei ben cao* relating to the entries *you ma* or *bai you ma* and another one in the same section: *hu ma* 胡麻. Kou Zongshi, the author of the *Ben cao yan yi*, already assumed that this was a case of a

¹⁹⁶ For a description of this book, see SCC Volume 6, Part 1, pp. 331–47, and pp. 66–7 in the present volume.

¹⁹⁷ A later facsimile edition produced in 1959 by Zhonghua shuju in Shanghai is the one used here.

¹⁹⁸ As readers are reminded in the preface by Li Lian 李濂 to the 1525 edition, 'if, in a year of famine, one seeks [for the plants] on the basis of these images and taking into account the particular regions, one cannot fail to find them easily'. See Zhu Xiao (1959, Volume 1, p. 2a.).

¹⁹⁹ *Sesamum indicum* L., according to Read (1946, p. 50). ²⁰⁰ *Perilla frutescens* Britt.

(a)



(b)



Fig. 34. Sesame: (a) *you zi miao* 油子苗 in *Jiu Huang Ben Cao* (1525, from the 1959 edition *Juan Xia Hou, Mi Gu Bu*, 卷下後, 米穀部, 4b); and (b) *you ma* 油麻 in *Zheng Lei Ben Cao* (1249, *Juan* 24, 7a), from Tang Shenwei (1957, p. 484).

homonymy; Zhu Xiao followed him in this hypothesis well before Li Shizhen, who made the same decision.

Another plant already cited in the *ben cao* is the opium poppy. Zhu Xiao describes it under the name *yu mi hua* 御米花 (imperial grain flower):

The treatises on *materia medica* name it *ying zi su* 罌子粟 (jar-millet), *xiang gu* 象穀 (similar to millet), *mi nang* 米囊 (sack of grains) or *nang zi* 囊子 (sack). It is everywhere. The shoot is one or two feet high. The leaf resembles that of indigo (*dian* 靛²⁰¹) in colour but it is larger and the edge is undulating, with prickles. The flowers that open are red or white with four petals. There are also double flowers.²⁰² The fruit forms a shell that resembles the point of a bone arrow. Inside the shell, there is grain with several thousands of seeds resembling those of *ting li* 荳蔴, a *draba*,²⁰³ but white. They are sown every year, the grain is excellent. Sweet taste, neutral nature, non-toxic.

²⁰¹ *Polygonum tinctorium* Ait. ²⁰² Literally, 'with a thousand leaves'.

²⁰³ *Draba nemorosa* L. var. *hebecarpa* Ledeb.; Jia Zuzhang and Jia Zushan (1955, Fig. 1279).



Fig. 35. Opium poppy, given here the name *yu mi hua* 御米花, in *Jiu huang ben cao* (1525, *juan xia hou*, *mi gu bu* 卷下後, 米穀部, 1b). Compare with Fig. 28.

The illustration that accompanies this text (Fig. 35) is very precise. As for the text itself, it too is recomposed from information already mentioned in the *Zheng lei ben cao*, the original contribution of the author being limited to the arrangement of these fragments and the first three characters, 'the *ben cao* name it'. The case of the lotus (Fig. 36) further confirms how deeply the texts remain marked by earlier works:

[In the] *ben cao* there is *ou shi* 藕實 [rhizome and fruit]. Another name is [lotus-cinabar] *shui zhi dan* 水芝丹 or *lian* 蓮. It comes from the pools and marshes of the Runan. Nowadays it is everywhere. It is born in the water. Its leaf is called *he*. It is circular with a diameter of over one foot. Its flowers are currently called *lian hua* 蓮花. They come in two kinds of colour, red and white. In the middle of the flower the fruit forms; it is called *lian fang* 蓮房 or, popularly, *lian peng* 蓮蓬 [the receptacle]. The dark green skin of this fruit (*lian*) envelops white seeds (*di* 的) that are the seeds of the lotus (*lian zi* 蓮子). The dark green heart inside the seeds is called *yi* 薏 [the embryo]. In autumn, the skin (*biao pi* 表皮) of the seed is black and the seed sinks into the water. This seed, dried inside the receptacle, is called the stone of the lotus (*shi lian* 石蓮). Its root is called *ou* 藕. The *Er ya* says: '*he* 荷 is *fu qu* 芙蕖, its stem is *jia* 茄, its leaf is *xia* 葭, its base *mi* 蓆. [*Mi*], it is said, is the white root (*bai ruo* 白藕), at the base of the stem that is in the mud. It is between the nodes of the root *ou* that the buds (*meng ya* 萌芽) first form. Its flower is *han dan* 菡萏, its fruit *lian*, its root *ou*, that which is inside *di*, is *yi*'; that is how it is [according to the *Er ya*]. *Fu qu* is the general term (*zong ming* 總名); a synonym is *fu rong* 芙蓉. It is also said that *han dan* is the unopened flower and that *fu rong* is the flower fully in bloom. The receptacle, the fruit and the stem have a sweet taste and a neutral-cold nature, and possess no toxicity.



Fig. 36. Lotus, given here the name *lian ou* 蓮藕, in *Jiu huang ben cao* (1525, *juan xia hou, guo bu*, 卷下後, 果部, 27a). Compare with Figs. 13, 14 and 38.

Now let us turn to a plant ‘newly added’, as is noted in the margin of the engraving, the ‘soft jujube’, *ruan zao* 軟棗 (Fig. 37):²⁰⁴

It is called clove-kaki, kaki-cow’s piss or jujube-goat’s dung. [In the] *Er ya* it is named *ying* 櫻. The ancient writings do not indicate its provenance. Today, there are many in this region.²⁰⁵ By its branches, leaves, twigs and trunk, it belongs to the category of the kaki²⁰⁶ but the fruits that it gives are very small: once they are really ripe, they have a rather purple colour, a sweet taste, a warm nature – some say rather cold – and they are free of toxicity. When eaten to excess, they provoke a cough through ‘cold wind’.

As we can see from reading this, for the plants that are ‘newly added’, the author proceeds according to the same principle of describing by analogy as he does when

²⁰⁴ *Diospyros lotus* L. Read (1946, p. 53); see Zhu Xiao (1959, Volume 4, *guo bu*, p. 11b). The case of this persimmon – which, on account of the form of its fruit, is considered in popular Chinese taxonomy as a variety of jujube, although its branches, leaves, twigs and trunk all lead Zhu Xiao to consider it a kind of kaki – reminds us that folk taxonomies and scholarly ones do not obey the same criteria and therefore follow different logics when classifying objects. This example also shows us that this partially consummate way of presenting plants that Zhu Xiao has chosen simply corresponds to a practical arrangement devised for his book and not to the implicit classification to which he seems, in his comment, to refer.

²⁰⁵ The Kaifeng region.

²⁰⁶ *Shi* 柿, *Diospyros kaki* L. f.; Jia Zuzhang and Jia Zushan (1955, Fig. 0481).



Fig. 37. Date plum (*ruan zao* 軟棗, *Diospyros lotus* L.), in *Jiu huang ben cao* (1525, *juan xia*, *guo bu*, 卷下後, 果部, 17a).

he compiles citations. Nevertheless, he is not averse to analysing the facts, and is therefore led to recognise that this tree is a persimmon, not a jujube tree. With regard to the graphic representations of plants, assuming that the 16th-century illustrations take over those of the first edition, it seems to me that this work more or less measured up to the author's descriptions.²⁰⁷ But even if he indeed made it possible for readers who were familiar with plants to recognise a certain number of those that are described and illustrated, the possibility of identification without previous knowledge seems much less certain.

One century after the publication of the *Jiu huang ben cao*, 1505 saw the completion of the manuscript of the *Ben cao pin hui jing yao* 本草品彙精要 under the direction of Liu Wentai 劉文泰.²⁰⁸ Since the iconographic part of the work had never been printed, the illustrated plates are not engravings but original drawings in colour. Let

²⁰⁷ In this connection, Craig Clunas, whom I should like to thank, has pointed out to me that in the catalogue entitled *Bai chuan shu zhi* 百川書志 for the rich library of Gao Ru 高儒, the latter notes that in this book 'the pictures resemble their forms, the explanations record their uses'. Craig Clunas then goes on to say, 'This is a very rare contemporary statement about the presence of botanical illustrations in a Ming book from the reader's point of view'.

²⁰⁸ See the presentation of the classification of plants, pp. *** above.

us now continue our enquiry into the description of the lotus. It is cited in the section on fruits endowed with ‘grassiness’.²⁰⁹ The rubric *miao*, devoted to the description of this plant, is presented as a citation from the *Ben cao tu jing*. But in fact the text repeats, in a different order, the citation that had already appeared in the *Zheng lei ben cao*, a translation of which is given above, completed by passages borrowed from other sources. For example, it notes that the stem is indeed named *jia*, but adds that before it emerges from the water it is called *jīn tiáo* 金條, ‘golden branch’. Furthermore, the text notes that the flowers come in two colours: red and white. If the flowers are white, the rhizomes are thick and the seeds are small, but if the flowers are red, the opposite applies. In the case of double flowers, the plants produce no fruit. The rubric concludes with some almost ethical remarks: ‘it grows in the water but the water cannot drown it; even if it lives in the mud, the mud cannot impede it. Its body is hollow, which is why eating it can make one happy’.²¹⁰ The parts used and named are the same as before: the rhizome, *ou*; the seed, *shi*; the stem (petiole), *jīng* 莖; the leaf peduncle, *ye di* 葉蒂 or *he bi* 荷鼻; the seed germ, *yi*; and the flower, *hua*. As for the drawing that precedes the text (Fig. 38), in its composition it is very reminiscent of the one that already figures in the *Zheng lei ben cao* (Fig. 13b). To that same model, there has been added one detail that is often to be found: stamens at the base of the receptacle after the petals have fallen, as well as a flower in bud. When I compare these two images, I cannot help regarding the second as an improved version of the first, no doubt obtained by direct observation. Although the copy is sometimes less obvious, it incorporates similarities that put one in mind of ‘variations on a given theme’, as does the pomegranate (Figs. 39, 40) or the chestnuts (Figs. 23, 41). The information provided by such improvement is sometimes even greater, as in the case of the lacquer tree, for which the drawing in the *Ben cao pin hui jing yao* (see Fig. 42b) provides an image of the tree in flower and represents in detail the process of extraction that was no more than hinted at in the engraving produced at the of the Song period (see Fig. 42a). This treatment of *materia medica* in a considerable number of entries confers upon the work an undeniable extra interest that is of great value to the history of techniques.²¹¹

²⁰⁹ On the creation of this neologism and its meaning, see above and *SCC* Volume 6, Part 1, pp. 307–8 and note e, p. 307. On the structure of the entries in the *Ben cao pin hui jing yao*, see pp. 67–74, 101 above and *SCC* Volume 6, Part 1, pp. 303–5.

²¹⁰ Lu Wentai (1982, p. 768).

²¹¹ A number of publications make it possible to form some idea of the quality of various versions of the *Ben cao pin hui jing yao*. Four pages of the definitive original manuscript (1505), in colour, are reproduced in the *Illustrated Catalog of Rare Books in the Kyō-U Library*, published on the occasion of the twentieth anniversary of the opening of the extremely rich library of the Takeda Foundation in Osaka (Japan) (anon. 1998, p. 13). Examples of similar illustrations from the definitive manuscript and the manuscript preserved in the Biblioteca nazionale centrale in Rome (Italy) are given by G. Bertuccioli (1956). Other plates from that same manuscript are reproduced in colour in Métaillé (2001d, pp. 542–4). Recently, in Japan, a complete facsimile copy of another manuscript has been published by its owner, Dr Otsuka Yasuo, see anon. [Otsuka] (2002). Another published work that conveys a good idea of the whole manuscript does not, paradoxically, bear the same title. This is an anonymous *Shi wu ben cao* (edible *materia medica*) from the Imperial Library of the Ming Court, recently published in facsimile (anon. 2000). Many of the illustrations reuse those of the *Ben cao pin hui jing yao* and the page numbering is identical.



Fig. 38. Lotus in the manuscript of *Ben cao pin hui jing yao* (1505, *juan* 32 果部上品, n.p.). Compare with Figs. 13, 14 and 36.

安石榴

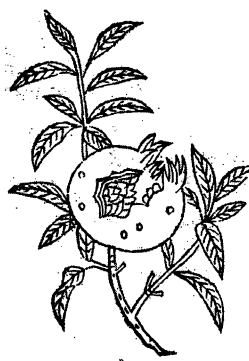


Fig. 39. Pomegranate (*an shi liu* 安石榴), in *Zheng lei ben cao* (1249, *juan* 23, 33a), from Tang Shenwei (1957, p. 475).



Fig. 40. Pomegranate, in the copy of the *Ben cao pin hui jing yao* (1505) that Father d'Incarville ordered around 1740, and was sent in 1772 by Father Martial Cibot (Ms 986, folio 307).

The *Ben cao meng quan* 本草蒙筌 by Chen Jiamo 陳嘉謨, published in 1565, continues to cite the lotus in the fruits section, under the title *lian zi* 蓮子. The engraving is very schematic and the text provides no description. But as the therapeutic indications are classified according to the various parts that are used, this provides a morphological inventory of the plant: the first entry is *lian zi*, the seeds, which can be consumed either together with the 'heart', *xin* 心, or without it. The other parts cited are *shi lian zi* 石蓮子, the seed-stones that fall to the bottom of the water; *he bi* 荷鼻, glossed by *di* 蒂, the leaf attachment; *lian fang* 蓮房, glossed by *peng* 蓬, the receptacle; *he ye* 荷葉, the leaf; *hua ban* 花瓣, the petals; *hua xin* 花心, the 'heart of the flower', also named *fo zuo xu* 佛座鬚, 'the beard of Buddha's throne' (that is to say, the collection of stamens surrounding the receptacle); and finally *jie* 節, the nodes (of the rhizome). Despite the absence of any description, we can see that here all the different parts of the plant are named, producing what might be called a kind of impressionist description. But, in any case, this minimal kind of description did not lead to any particular effort where the illustration is concerned, for it really is quite minimal (Fig. 43).

The *Ben cao gang mu*, published in 1596 but completed twenty or so years earlier, brings us to the problem of the identification and description of the lotus from two



Fig. 41. Chestnut tree and fruit (*li zi* 栗子), in *Ben cao pin hui jing yao* (1505, *juan* 32, n.p.). Compare with the illustrations in the various editions of *Zheng lei ben cao* in Fig. 23.

(a)



Fig. 42. Lacquer tree (*qian qi* 乾漆): (a) in *Zheng lei ben cao* (1249, *juan* 12, 27a), from Tang Shenwei (1957, p. 301); (b) in *Ben cao pin hui jing yao* (1505, *juan* 16, n.p.).

angles: the name and the thing. It is still classified among the fruits, the title of the principal entry being *lian ou*, the rhizome of the lotus, followed by a secondary entry *lian shi*, the fruit of the lotus. On the subject of the various names used in the texts to designate the lotus, Li Shizhen, after citing various commentaries on the text of the *Er ya*, writes in the rubric *shi ming* 釋名, ‘explanation of names’,²¹² as follows:

The *Er ya* considers that *he* 荷 is the name of the root, Mr Han²¹³ makes *he* the name of the leaf, Lu Ji 陸璣²¹⁴ considers that *he* is the name of the stem. Given that the stem is what bears the leaf, *jing* [stem] has the meaning of ‘bears (*he*)’ if one follows the explanation of Lu [Chi]. *Mi* 蓂 are the *nen ruo* 嫩弱 [young roots growing at the nodes of the rhizome] like those that grow from the tips (*bian* 鞭) [rhizomes] of bamboos. At the nodes two stems emerge; one makes a leaf, the other a flower. Between the nodes there is the *ou* [rhizome], the origin of flowers, leaves, roots and seeds. To display the seeds while preserving them, and not to hoard them once that task is complete, is said [to mean] to give up what one possesses in order to retire all alone (*mi* 密): that is why one says *mi*. Flowers and leaves

²¹² Li Shizhen (1975–81, Volume 3, p. 1893).

²¹³ Han Baosheng 韓保升, the author of the *Shu ben cao* 蜀本草 (Pharmacopaeia of the State of Shu (Sichuan)), originally named *Chong guang ying gong ben cao* 重廣英公本草 (New Enlarged Pharmacopaeia of Duke Ying), a revision of the *Xin xiu ben cao*, which was completed between +938 and +950. See SCC Volume 6, Part 1, pp. 277–8, and Okanishi Tameto (1977, pp. 67–8).

²¹⁴ The author of the commentaries on the *Shi jing* entitled *Mao shi cao mu niao shou chong yu shu* 毛詩草木鳥獸蟲魚疏, completed in around +254. See SCC Volume 6, Part 1, pp. 464 ff.

(b)



Fig. 42. (cont.)

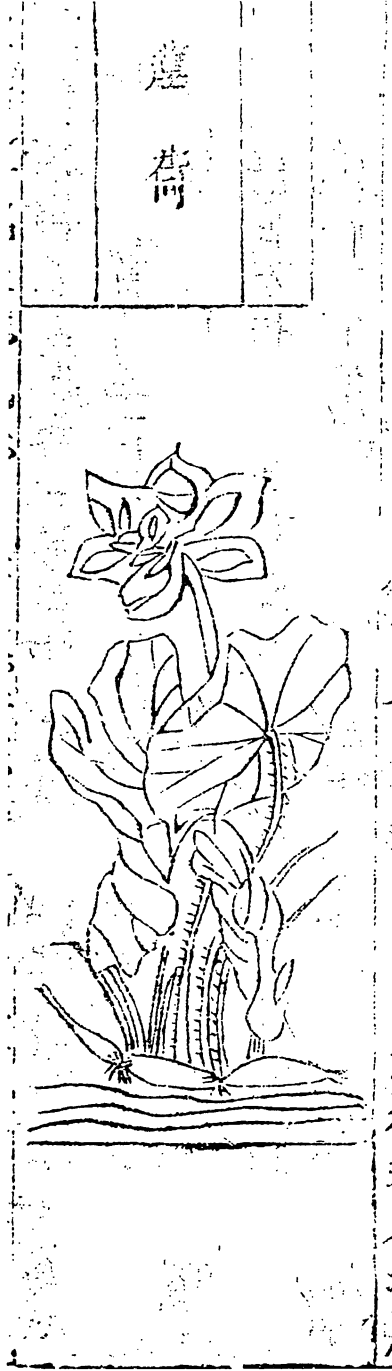


Fig. 43. Lotus, in *Ben cao meng quan* (1565, *juan* 7, 11a). Compare with Figs. 13, 14, 36, 38 and 44.

always grow alternately (*ou sheng* 偶生), that is why the root is called *ou* 藕. It is also said that the *ou* ploughs the mud; that is why the character [*ou*] is derived from *ou* 耦, which means to plough (*geng* 耕). *Jia* 茄 [which designates the leaf stalks] is pronounced like *jia* 加 [which means to add]; [that is because] they are added above the *mi*. *Xia* 薹 [which designates the leaf] is pronounced like *xia* 遐 [which means distant], [because] it is distant from *mi*. *Han dan* 萵苣 [which designates a flower not yet open] [is because] *han* 函 has the meaning of ‘closed before opening’. *Fu rong* 芙蓉 evokes opening up *fu bu* 敷布 and a beautiful appearance *rong yan* 容艷. What is understood by *lian* 蓮 [the receptacle] is *lian* 連 [to bind]: the flowers and fruits emerge bound together. What is understood by *di* 葯 is *di* 的 [target]: the seeds are on the receptacle like so many impacting arrows. *Di* is the name of that which makes points on objects. *Yi* 薏 is like *yi* 意 [feeling], the bitterness that it contains is held in. The ancient poem says, when one eats the seeds, if one does not remove the heart [the embryo], its bitterness develops and persists. That is the explanation.

Passing on to *ji jie* 集解, ‘grouped explanations’, Li Shizhen continues as follows:

Lotuses are to be found in all the lakes, pools and swampy marshes of the Jing 荆,²¹⁵ the Yang 揚²¹⁶ and the Yu 豫.²¹⁷ Having emerged from the seeds, the growth is slow; but it is very rapid when it starts from the germs of the rhizome (*ou*). The germ sinks into the mud to form white roots (*bai ruo*); this is [what is called] *mi*. The largest are more than six feet long. At the fifth or sixth moon, when they are tender, they are gathered from the deep water and are eaten as vegetables, popularly called *ou si cai* 藕絲菜 [silk vegetables of the rhizomes]. Of the two stems that emerge from the nodes, one is *ou he* 藕荷 [lotus rhizome]. The top of the leaf rests on the surface of the water, whereas what is below [the node] spreads out laterally to form the rhizome. The other [stem] is *ji he* 芰荷 [lotus water chestnut]; its leaf emerges from the water; its lateral stem produces a flower. The leaves grow after *Qing ming* 清明 [‘pure light’]:²¹⁸ the flowers open at the fifth moon and the sixth; they are of three colours: white, red and pink. At the heart of the flower there are yellow *xu* [hairs] [stamen threads], the *ru* [anthers] are over an inch long; in the hairs, there is the *lian* (receptacle). The flower falls away while the receptacle (*fang*) produces seeds (*di*) that are arranged like wasps on their nest. At the sixth and the seventh moons those that are tender are gathered; they are delicious eaten raw. In the autumn, the receptacle dries out and the black seeds are as hard as stones; they are called *shi lian zi* [stone lotus seeds]. At the eighth and ninth moons, they are gathered, the black shell is broken and they are sold everywhere and are called *lian rou* 蓮肉 [lotus flesh]. During the winter and until spring, the rhizomes are pulled up and eaten. The rhizomes are white, with holes, and are fibrous. The large ones are as thick as an arm and six to seven feet long, with five or six nodes. Generally, the wild [lotuses] and those with red flowers have many seeds and a puny rhizome. The cultivated ones and those with white flowers have few seeds but a fine rhizome. Those with white flowers are perfumed, those with red ones are beautiful and those with double ones do not fruit. There are others ... but they are of different kinds (*yi zhong* 異種), which is why they are not described. It is written in the [*Wu lei*] *Xiang gan zhi* 物類相感志:²¹⁹ ‘if one covers a hole with

²¹⁵ The zone that includes the present-day provinces of Hunan and Hubei.

²¹⁶ The name of the Yangzi River between Yizheng and Yangzhou. ²¹⁷ Meaning Henan.

²¹⁸ The beginning of one of the twenty-four fortnights of the solar year. Around 5 April.

²¹⁹ This consists of an interesting collection of practical recipes for daily life attributed to Su Shi 蘇軾 (Dongpo 東坡) (1037–1101). Probable author, a monk named Lu Zanning 錄贊寧.

lotus stems, the rats will flee of their own accord. If one makes a decoction and uses it to wash stained tin, it becomes as if new'. That is the nature of things (*wu xing* 物性).

Let us pause to consider these two paragraphs. The first characteristic is the importance of the names that determine the terminology even when serving to describe the parts of the plant, in a strict causal relationship. When considering the function or the disposition of the various named parts of the plant, Li Shizhen proposes a philological explanation to justify the reason for the use of each term. Words are, in a sense, the key to a deep understanding of the object. This text provides a clear illustration of the nature of the entry in the book in which it appears. It is a matter of closely associating notions and names. Now considering the direct description of the plant in the second extract, a second clear characteristic is the dynamic perspective in which the plant is considered: the various parts are described as they develop. We start with the seed and eventually arrive at the fruit.²²⁰ We should also remark the noting of non-medicinal uses – which will be further explained in other special sections – and the attention that is paid to popular names and uses. Finally, there is even a 'moral' dimension to the observation of nature. These texts certainly provide a masterly illustration of what Li Shizhen meant by *ge wu zhi xue* 格物之學, the study of the investigation of things. The description of the lotus certainly provides an extreme example, with the profusion of specialised terms that characterise it and, no doubt in view of this fact, the absence of any analogical reference to other plants. As a general rule, however, Li Shizhen's descriptions are partly analogical, for example the one that he provides of the poppy. Compared to the richness of the morphological details provided by the text, the graphic representation of the lotus is quite summary but is nevertheless explicit (Fig. 44).

He calls the opium poppy jar-millet, *yíng zǐ sù* 罌子粟, and he classifies it in the category of 'millets' in the grains section. He writes as follows:

Planted in the autumn, it grows in the winter; the young shoots make an excellent vegetable. The leaves resemble those of the prickly lettuce. During the third and fourth months, stems develop and produce dark green envelopes; the flowers open and the envelopes fall off. Each flower has four petals, as large as a small bowl; the jar is in the middle of the flower, surrounded by hairy stamens and the *nú* [anthers]. The flower remains open for three days, then withers and the jar remains at the top of the stems, two or three inches long and as thick as a [capsule] of birthwort.²²¹ On top there is a lid and beneath it a base, just like a jar of beer. Inside, there are tiny white seeds; these can be boiled or else eaten as a cooked grain [to accompany dishes] . . .

This example shows that the objective morphological description is completed by a comparison with other plants assumed to be known to the reader, in this case the leaves of a wild prickly lettuce and the fruit of birthwort, the particular shape of

²²⁰ There is, here, a certain analogy with the ideas of Goethe on 'the metamorphoses of plants' (see Goethe 1975).

²²¹ *Aristolochia debilis* Sieb. et Zucc. *Ma dou ling*.; Jia Zuzhang and Jia Zushan (1955, Fig. 1559).



Fig. 44. Lotus, in *Ben cao gang mu* (1596, *fu tu juan zhi xia, guo bu tu, guo bu shui guo lei fu tu* 附圖卷之下, 果部圖, 果部水果類附圖, 15b). Cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 39). Compare with Figs. 13, 14, 36, 38 and 43.

which sometimes causes it to be called a ‘horse bell’. In general, the description given by Li Shizhen is not limited to the parts used in pharmacopoeia. On the other hand, even if he cites and takes into account the texts of his predecessors, in almost every case he also registers his own point of view by giving a personal description. This naturalistic dimension of the work is certainly not absent from the impact of the *Ben cao gang mu* on later botanic literature. The example of the way that Wang Xiangjin in his *Qun fang pu* implicitly uses the text of Li Shizhen²²² certainly illustrates the crucial role that the *Ben cao gang mu* played as a reference text in the description of natural objects, even, in fact above all, outside the field of medicine. Thanks to the diffusion of the *Ben cao gang mu*, the terminology used by Li Shizhen for describing plants played an important role before the appearance of modern botany, not only in China but also in other countries of East Asia that had borrowed Chinese writing.²²³

Successively taking into consideration the various parts named, I shall now present a detailed analysis of this vocabulary.

The underground part. The first term, *gen* 根, is very often found in descriptions designating the underground parts of a plant, in general the roots – for which *gen* is, still today, the standard term – but also rhizomes, tubers and bulbs. Actually, there are also specific terms for the rhizomes of certain plants. In the case of the Indian lotus, as we have just seen, Li Shizhen, on the strength of the *Er ya*,

²²² For a glimpse of this, see p. 28 above – his description of ginger.

²²³ See Métailié (2002; 2004b; 2010).

distinguishes between *ou* 藕 for the rhizome and *ruo* 莖 for the root of a shoot. The latter term also refers to roots that sprout from the knots of the rhizomes of bamboos, while these rhizomes are named *bian* 鞭 (whip). The rhizome of fresh ginger is called *mu jiang* 母薑 (ginger-mother). A term peculiar to the bulbs of plants in the Araceae family is *kui* 魁. For plants belonging to the botanic genus *Allium*, such as garlic, the cloves are called *ban* 瓣 and the ‘head’ that they form is named *ke* 顆. *Gai* 菱, the second term for the lower part of the stem of these plants, seems already to have become obsolete by Li Shizhen’s day.²²⁴ The small roots and rootlets are compared to a beard, *xu* 鬚, as in the case of spirodelas, *shui ping* 水萍 (*Spirodela polyrhiza* Schleid.). As for the morphological characteristics of the ‘root’, the epidermis is named *pi* 皮, ‘skin’, the internal part, *rou* 肉, ‘flesh’. There may be *jie* 節, nodes, in it. The fact that herbaceous plants last for more than one year is a distinctive feature often mentioned by Li Shizhen; he calls the roots or rhizomes that have this property *su gen* 宿根, ‘root that lasts’. Another important characteristic is the nature of the bodies of roots: some are hollow, others solid. Thus Li Shizhen often establishes a comparison between *zhong kong* 中空, ‘hollow interior’, and *zhong shi* 中實, ‘full interior’. The principal properties mentioned, apart from the taste and the smell, are the plant’s medicinal nature, *ru yao* 入藥, and ‘the production of young shoots’, *sheng miao* 生苗.

The stem. Several terms are used to name the part of a plant that is above ground. The most general, both for herbaceous plants and for trees, which is still in use today, is *jing* 莖. The trunk of a tree is also named *gan* 幹, while the stem of an *Allium* is called *tai* 薹. Descriptions of stems generally begin with a dynamic view. For example, in the case of *ze qi* 澤漆,²²⁵ a euphorbia, ‘In the spring, a shoot develops, the foot (*ke* 科) produces branches so as to form a bush’. Li Shizhen’s classic method for describing a herbaceous plant is to begin with the emergence of shoots from the root and end up with the appearance of fruits. In the last example, I translated *ke* as ‘foot’. More often, in this context Li Shizhen uses *ben* 本, ‘base’. The most frequent terms for shoots are *miao* 苗 or *ya* 芽. The main characteristics noted for a stem are having nodes and being either hollow or solid. The shape of the cross section is also an important feature for Li Shizhen. He writes: *fang xing* 方形, ‘square’; *yuan* 圓, cylindrical; or *you ... leng* 有 ... 棱, ‘with sharp angles’. He contrasts upright stems, *zhi jing* 直莖, with others that may, as in the case of purslane, be described as *bu di* 布地, ‘spread out on the ground’. Sometimes he chooses a more specific term, *man* 蔓 ‘twining stem’. The description of the vine, *pu tao* 葡萄, is a good illustration: ‘In the spring, it emits envelopes, *bao* 苞, that produce leaves, irregular like those of the *gua lou* 栝樓²²⁶ but with five points. Tendrils [literally ‘beards’] appear and develop into vine shoots (*sheng xu yan man* 生鬚延蔓) that extend for several hundreds of feet’. In this case we find the term *xu*, ‘beard’,

²²⁴ This is borrowed from the terminology of the *Er ya* and means ‘liliaceous bulbs and corms’ (SCC Volume 6, Part 1, p. 129).

²²⁵ *Euphorbia helioscopia* L. See Li Shizhen (1975–81, Volume 2, p. 1134).

²²⁶ *Trichosanthes* sp.

already used to designate tiny roots, the threads of stamens, and the stylus, with the new meaning of ‘tendrils’,²²⁷ which are also named *juan zu* 卷鬚, ‘curly beard’, in the descriptions that Li Shizhen produces of Cucurbitaceae. A stem without ramifications is *wu zhi* 無枝. When a stem or a root is ramified, generally the expressions used are *you zhi* 有枝, ‘there are branches’, or *fen zhi* 分枝, ‘is divided into branches’. For trees, three levels of ramification are distinguished: *zhi* 枝, branch; *tiao* 條, bough; and *shao* 梢, twig.

The leaf. The basic term, still used today, is *ye* 葉. Phyllotaxy is an important point for Li Shizhen, who distinguishes between the following cases: *dui sheng* 對生, opposite, as in the purslane; *dui jie sheng* 對節生, opposite at alternate nodes, as in *da qing* 大青 (*Isatis oblongata* DC.); *si xiang sheng* 四向生, growing in four directions, verticillate, as in the lily, *bai he* 百合; and *bao jing sheng* 抱莖生, growing around the stem, clasping, as in the leaves of reeds.

Colour, taste, hairiness and the texture of the upper side, *mian* 面, and the lower side, *bei* 背 (literally ‘back’), of the leaf are often cited. The characteristics of the edges are also taken into account. The base, *ben* 本, is sometimes opposed to the top, *mo* 末. The cross section may also be mentioned if the leaf is hollow. In the case of the lotus, *di* 蒂 designates the upper part of the petiole or leaf stalk, as has been mentioned above. As for the shape of the leaf, it seems that a simple lanceolate leaf is taken as the standard, for in this case only its length is mentioned. Otherwise several kinds of lobe are distinguished: circular, *yuan* 圓; oblong, *tuan* 團; with a given number of points, *you* [number] *jian* 有 [number] 尖, generally three for various triangular shapes (sagittate leaves, for example), or five for palmate leaves, but in the case of the digitate leaf of *bai hua cai* 白花菜, a Capparidacea,²²⁸ the description runs as follows: ‘a stem, five leaves, [each] leaf as thick as a thumb’.²²⁹ The term *huo* 藿, indicated in the *Shuo wen jie zi*, is still used to designate the trifoliate leaf of soya. It is sometimes also used to designate leaves that are similar, but in the case of the leaf of the broad bean the same structure is referred to as ‘one stem, three leaves’.²³⁰ Some bipinnate leaves are called *ya ye* 丫葉 (‘forked leaves’), as are those of an angelica, *ma qi* 馬蕒.²³¹ The tripinnate leaf of *xiong qiong* 芎藭,²³² an

²²⁷ The use of a term, often monosyllabic, with different meanings is typical of classical Chinese scientific terminology. In such cases, it is the context that is discriminatory. See Métaillé (1981). It is worth noting at this point that Western scholars did almost the same thing, but at the level of meaning. Clearly, as they used Greek and Latin roots to create their technical vocabulary, their terminology appears to be more diversified. Here are a few examples: where the Chinese literati used *hua* as the basic term for the flower vocabulary, Western scholars could use *anthos* or *flos*, as well as the terms meaning ‘flower’ in their own respective languages. The same went for leaf: *ye* in Chinese, versus *phyllon* in Greek and *folium* in Latin. The terms for various types of ‘root’ – in the wider sense – were formed by using *radix* or *rhiza*, and so on. See Stearn (1966).

²²⁸ *Pedicellaria pentaphylla* Shrank.

²²⁹ *Yi zhi wu ye ye da ru mu zhi* 一枝五葉葉大如拇指, in Li Shizhen (1975–81, p. 1641).

²³⁰ *Yi zhi san ye* 一枝三葉, in Li Shizhen (1975–81, p. 1519).

²³¹ According to the interpretation given by Read (1936, p. 55, no 212), *Angelica yabeana* Makino. The identification today would be *Angelica genyflexa* Nutt., in Makino Tomitaro (1970, p. 444). However, the botanic description given by Li Shizhen suggests to me that the plant corresponding to *ma qi* is more likely to be *Angelica citriodora* Hance; see anon. (1972–6, Volume 2, p. 1089).

²³² *Comoselinum unvittatum* Turcz.

umbellifer (Apiaceae), is described as ‘resembling celery but slightly more slender and narrow, with forking forks (*you ya cha* 有丫叉)’. The frondy basal leaves of fennel are ‘silken leaves’, *si ye* 絲葉. Pine trees have leaves formed by several needles, *zhen* 鍼, the number of which – two, three or five – makes it possible to differentiate between the species.

The flower. *Hua* 花 is the general term for a flower. Inflorescences are described in different ways. *Sui* 穗, ear, is used for plants of various kinds, graminaceous ones and plantains, but also a few labiate ones. In the latter case, when the flowers surround the stem, this is described as ‘making ears that produce households’, *zuo sui cheng fang* 作穗成房.²³³ *Fang* 房 is also used to designate the umbels of *fang feng* 防風 formed of delicate white flowers.²³⁴ However, more frequently, to designate the umbels it is said that the plants ‘open broken flowers that form a tribe’, *kai sui hua cheng zu* 開碎花成族. Catkins are called *rou ti* 葦莢 for willows, but for those of chestnut trees it is said that ‘the flowers make sprigs as thick as chopsticks’, *qi hua zuo tiao da ru zhu tou* 其花作條大如箸頭.²³⁵

Now let us consider the different terms that Li Shizhen chooses for naming the parts of a flower.

Ban 瓣, sometimes replaced by *chu* 出, is generally used for ‘petal’. However, in the case of double flowers, in which the stamens have been transformed into pseudo-petals to delight the eyes of flower-lovers,²³⁶ one comes across ‘a thousand leaves’, *qian ye* 千葉, as opposed to *dan ye* 單葉, ‘single leaf’, expressions in which *ye* means not ‘leaf’ but ‘petal’.²³⁷ A frequent way of indicating the number of petals for single flowers is to indicate a number followed by *chu* 出. In a case where the petals are stuck together, as with aubergine flowers, they are ‘linked together’, *xiang lian* 相連.

Inside the flower, surrounded by petals, Li Shizhen recognises *rui* 蕊 and *xu* 鬚 or *leng* 棱. The first of those terms refers to the coloured parts, often hanging down, generally the anthers, for which he notes the colour, usually yellow but sometimes red, as in certain lilies. When it flowers, the willow catkin is called ‘the flower with yellow anthers’, *huang rui hua* 黃蕊花. When it is matter of composite flowers like those of chrysanthemums, the *rui* are in fact stigmas.²³⁸ The two other terms,

²³³ The comparison is particularly suitable if one thinks of the traditional circular, ring-shaped dwellings of the Hakkas, which could accommodate dozens of families.

²³⁴ *Saposhnikovia divaricata* Turcz. Schischk. (= *Siler divaricatum* Bth. and Hk.), see anon. (1972–6, Volume 2, p. 1075).

²³⁵ See Li Shizhen (1975–81, p. 1752).

²³⁶ This characteristic was particularly appreciated in shrub peonies, *mu dan*, during the Tang and the Song dynasties. On the history of the cultivation of this plant, see Li Hui-Lin (1959) and SCC Volume 6, Part 1, pp. 394–409.

²³⁷ In Europe, ‘leaf’ was, for a long period, also used with the meaning ‘petal’, for which specific terms were attested only in 1726 in English (Onions 1973) and in 1718 in French (Robert 1970). For example, on the first page of *The British Herbal* (Hill 1756), the footnote reads as follows: ‘The leaves which compose a flower are called petals’.

²³⁸ In modern terminology, this morpheme is used with the implicit sense of ‘the sexual part of the flower’. The first to make this choice was a Japanese scholar, Udagawa Yoan, in the first text on modern botany in Japan, *Botanika kyō* (The Sutra of Botany), published in 1822; then Ito Keisuke, who in his *Taisei honzō meisō*

'beard', *xu*, and 'quadrangular post', *leng*, refer first to the filament of stamens and also sometimes to the stylus of the pistil, upstanding parts of the flower. A particularly developed pistil (which will become a capsule) of the opium poppy flower, encircled by numerous *xu* and *rui*, is called a 'jar', *yíng* 罌.

Generally, a description of a flower begins simply by 'it flowers (*kai hua* 開花) at such or such a period'. Sometimes, as for the opium poppy, *yíng zǐ sù*, the phase preceding this moment is described: 'a stem emerges and forms dark green envelopes (*chou tai jie qing bao* 抽薹結青苞²³⁹) that fall off at flowering'. For the aubergine flower, after describing the petals and the five filaments of stamens, Li Shizhen goes on as follows: 'yellow anthers and green base, the base envelops the aubergine', *huang rui lü di, di bao qi qie* 黃蕊綠蒂蒂包其茄.²⁴⁰ *Di*, here translated as 'base', refers in this case to the withering calyx; previously, in the context of the lotus flower, this same word designated the base of the leaf at the top of the leaf stem. The external envelope of the flower, generally the calyx, but sometimes also the corolla or the involucre of the flowers of the Compositae family (Asteraceae), is named *e* 萼, but this is rarely mentioned.

The fruit. After flowering a plant 'forms a fruit', *jie shi* 結實. Li Shizhen reminds the reader, in the preamble to the fruits section in the *Ben cao gang mu*, that the fruit of trees is *guo* 果, and that of grasses is *luo* 蔴. However, in the rubric 'Explanation of names' of the entry *hu lu* 葫蘆,²⁴¹ we read that 'all that is of the category of the *luo* should be called *gua* 瓜 (gourd)'. Elsewhere, in the case of *Ginkgo biloba* L., Li Shizhen writes that 'one removes the flesh and one takes the stone as a fruit', *qu rou qu he wei guo* 肉取核為果.²⁴² From these statements, it would seem that *guo* and *gua* are the edible parts of the 'fructifications', respectively, of trees and herbaceous or cucurbitaceous plants. In ordinary language, in both French and English, 'fructification' is simply 'fruit'. As for 'fruit' with the botanical sense of 'seed-bearing organ',²⁴³ the basic term for Li Shizhen is *shi* 實, while a number of other terms are used to distinguish different forms of fruit: *sui* 穗 for an ear or for fruits in the form of an ear; *jia* 莢, 'pod', for the dehiscent fruits that resemble legumes, siliques, silicles, capsules, follicles and winged seeds; *qiu* 球, 'ball', for cones; *bao* 苞, 'envelope', for the husks of chestnuts and acorns, the cupules of hazelnuts, the shucks of maize and the Trachicarpus; *fang* 房, 'housing', for fruits in bunches or clusters; *xu* 絮, 'floss of silk', for the silky achenes of Compositae or the hairy seeds of poplars; and finally *shen* 蓁 for the mulberries of mulberry trees. Within these principal types, one can find more terms peculiar to a particular group of plants or a particular species. For example, several names are used for fruits considered as kinds of pod, *jia*: *jiao* 角, 'horn', for the siliques or pods of Brassicaceae; *gao e* 藁萼, 'calyx-quiver', for the follicles of the Chinese parasol *wu tong* 梧桐; and *yu qian* 榆錢, 'elm-coin', for the winged elm seeds.

(Nomenclature of the Plants of the Far West) in 1829 suggested the terms that are still used today in Japanese and Chinese: *ci rui* (female *rui*) for pistil and *xiong rui* (male *rui*) for stamen. See Métailié (1987; 1988b; 1994a; 2001c).

²³⁹ Li Shizhen (1975–81, p. 1493).

²⁴⁰ Li Shizhen (1975–81, p. 1689).

²⁴¹ *Lagenaria vulgaris* Ser.

²⁴² Li Shizhen (1975–81, p. 1801).

²⁴³ Lawrence (1981, p. 753).

To describe a fruit, Li Shizhen notes the time when it ripens, its colour (before maturity, not ripe, *sheng* 生, and at maturity, *shu* 熟), the nature of its cortex and the taste of its flesh. Thanks to the descriptions that Li Shizhen gives of the different fruits, it is possible to understand how he perceives their structure. The fruits have a 'skin', *pi* 皮, that contains 'flesh', *rou* 肉, and the stone, *he* 核; the 'coccus' (shell), *ke* 殼, is the cortex of the stone and inside there is a kernel, *ren* 仁. The fruits in gourds possess *pi*, *rou* and *zi* 子 (seeds), together with *ren* and also *rang* 穰, which is the spongy pulp at the heart of gourds, where the seeds are to be found. For coconuts, *rou rang* 肉穰 is the white endosperm inside the nut. A *rang* is also to be found in walnuts, certainly in green walnuts. Chestnuts contain an envelope, *bao* 苞, that produces numerous spines, *ci* 刺, 'like a hedgehog'; they contain between one and four seeds, *zi* 子. Inside their cortex 'there is a membrane enveloping the kernels', *ke nei you mo li ren* 殼內有膜裹仁.²⁴⁴ Oaks have a fruit 'similar to a lichi nut, pointed', and 'its base has a cupula', *qi di yi you dou* 其蒂亦有斗.²⁴⁵

When one considers the illustrations, it is noticeable that the descriptions of Li Shizhen never refer to them. Unlike in the various known editions of the *Zheng lei ben cao*, the illustrations are not integrated into the text, but are all collected together in a separate supplement. At first sight, one would be tempted to say that the quality of these illustrations is inversely proportional to that of the descriptions, and this leads one to wonder about the origin of these engravings. One hypothesis that has been suggested²⁴⁶ is that Li Shizhen had not foreseen the addition of images to his text. At the time of publishing, the printer may have asked for a series of plates and these were hurriedly executed under the responsibility of the author's descendants, based on illustrations that had appeared in earlier works. In support of this supposition, there is the fact that, on the one hand, the illustrations do not figure in the text but form two separate fascicles of 'added plates', *fu tu* 附圖, under the names of his son and his grandsons and, on the other, these engravings seem all the more likely to be additions given that no passage in the text explicitly refers to them. However, another view is that these engravings were indeed executed by his descendants, his son Li Jianyuan 李建元²⁴⁷ or the latter's eldest son Li Jianzhong 李建中,²⁴⁸ but under the direction of Li Shizhen, and that they were ready at the same time as the manuscript, in 1578.²⁴⁹ The homogeneity of the style of these engravings is compatible with both those assertions. Nevertheless, whichever hypothesis we accept, we are faced with the problem of the quality of these illustrations, which are executed quite clumsily. According to the first hypothesis, the engravings were produced hurriedly by Li Shizhen's son and grandsons, copied from those that appear in the *Zheng lei ben cao*.²⁵⁰ But this raises the question of the source of most of the representations: the first

²⁴⁴ Li Shizhen (1975–81, p. 1752). ²⁴⁵ Li Shizhen (1975–81, p. 1812) (Texts of an Encyclopaedic Nature).

²⁴⁶ Watanabe Kōzō (1953) cited by Miyashita Saburo (1979b, p. 14) (Notes of the Literati).

²⁴⁷ Wu Zuoxin (1985, p. 35).

²⁴⁸ Tang Mingbang (1989, p. 21).

²⁴⁹ Wu Zuoxin (1985, p. 35).

²⁵⁰ Watanabe Kōzō, quoted by Miyashita Saburo (1979b, p. 6).

Table 17 *Li Shizhen's terminology for the main organs of plants in the Ben cao gang mu*

<i>gen</i> 根	1/ root
* <i>ruo</i> 莠	* Lotus
* <i>kui</i> 魁	* Araceae
<i>gen</i> 根	2/ rhizome
* <i>ou</i> 藕	* lotus
* <i>bian</i> 鞭	* bamboo
* <i>mu jiang</i> 母薑	* ginger
• <i>jing</i> 莖	• stem
• <i>gan</i> 幹	• trunk
• <i>tai</i> 臺	• scape
• <i>zhi</i> 枝	• branch
• <i>tiao</i> 條	• bough
• <i>shao</i> 梢	• twig
<i>ye</i> 葉	leaf
• <i>dui sheng</i> 對生	• opposite
• <i>si xiang sheng</i> 四向生	• verticillate
• <i>bao jing sheng</i> 抱莖生	• clasping
• <i>ya ye</i> 丫葉	• bipinnate
• <i>you ya cha</i> 有丫叉	• tripinnate
• <i>zhen</i> 鍼	• needle (pine tree)
<i>hua</i> 花	flower
• <i>sui</i> 穗	• spike
• <i>rou ti</i> 菜萸	• catkin
• <i>ban</i> 瓣, sometimes	• petal
<i>chu</i> 出	• anther (sometimes stigma)
• <i>rui</i> 蕊	• filet (of stamen)
• <i>xu</i> 鬚	• filet (of stamen) or stigma
• <i>leng</i> 棱	• external envelope (calyx, involucre of Compositae)
• <i>e</i> 萼	
<i>shi</i> 實	'seed-bearing organ'
<i>guo</i> 果	fruit of trees
<i>luo</i> 蒴	fruit of herbaceous plant
<i>sui</i> 穗	ear, fruit in form of an ear
<i>jia</i> 莢	'pod': the dehiscent fruits that resemble legumes, siliques, silicles, capsules, follicles and winged seeds.
<i>qiu</i> 球	'ball' for cones
<i>bao</i> 苞	'envelope' for the husks of chestnuts, acorns, the cupules of hazel nuts, the shucks of maize and the <i>Trachicarpus</i>
<i>fang</i> 房	'housing' for fruits in bunches or clusters
<i>xu</i> 絮	'floss of silk', for the silky achenes of Compositae or the hairy seeds of poplars
<i>shen</i> 蓊	mulberries of mulberry trees
<i>jiao</i> 角	'horn' for the siliques or pods of Brassicaceae
<i>gao e</i> 藁萼	'calyx-quiver' for the follicles of the Chinese parasol
	<i>wu tong</i> 梧桐

(a1)

(a2)



Fig. 45. A comparison of illustrations of plants in *Zheng lei ben cao* (1249 edn) and the first edition of *Ben cao gang mu* (1596). Bindweed (*xuan hua* 旋花) and Japanese morning glory (*qian niu zi* 牽牛子): (a1) *Zheng lei ben cao* (juan 11, 8a), from Tang Shenwei (1957, p. 264); (a2) *Zheng lei ben cao* (juan 7, 27a), from Tang Shenwei (1957, p. 185); (b) *Ben cao gang mu* (*fu tu juan zhi shang, cao bu man cao lei fu tu* 附圖卷之上, 草部類附圖, 36a), cf Li Shizhen (1975–81, Volume 2, *fu tu*: p. 46). Radish (*lai fu* 萊菔): (c) *Zheng lei ben cao* (juan 27, 14b), from Tang Shenwei (1957, p. 505); (d) *Ben cao gang mu* (*fu tu juan zhi shang, cai bu hun xin lei fu tu* 附圖卷之上, 菜部葷辛類附圖, 11b), cf Li Shizhen (1975–81, Volume 3, *fu tu*: p. 25). Wheat (*xiao mai* 小麥): (e) *Zheng lei ben cao* (juan 25, 12b), from Tang Shenwei (1957, p. 491); (f) *Ben cao gang mu* (*fu tu juan zhi shang, gu bu ma mai dao lei fu tu* 附圖卷之上 穀部麻麥稻類附圖, 48a), cf Li Shizhen (1975–81, Volume 3, *fu tu*: p. 21).

edition of the *Ben cao gang mu* contains 1,109 plates²⁵¹ and some of the engravings bear no apparent relation to those of the *Zheng lei ben cao*, as can be seen from the examples of the two convolvulus plants, the radish, the lotus and also the wheat (Fig. 45). The influence of the *Zheng lei ben cao* seems to affect no more than roughly 7 per cent of the images,²⁵² as in the cases of the vine, the jujube and the plantain, and also the coltsfoot of Qinzhou and Luzhou (Fig. 46). The last two of those examples also show the extent to which the copy has simplified the representation. A systematic schematisation is what strikes one when one contemplates the whole collection of the

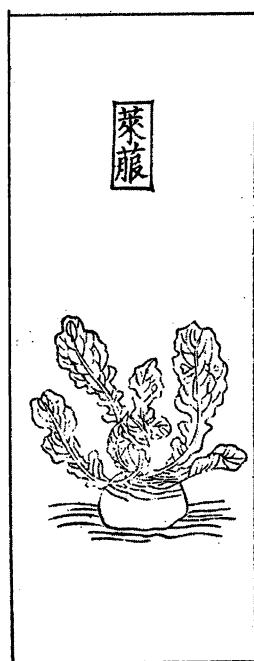
²⁵¹ Xie Zongwan (1985, p. 146).

²⁵² Chen Chongming (personal communication).

(b)



(c)



(d)



Fig. 45. (cont.)

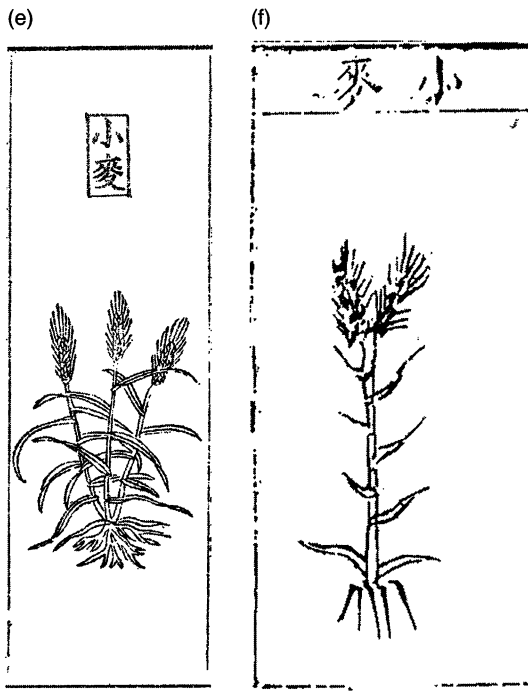


Fig. 45. (cont.)

(a2)

(a1)



Fig. 46. A comparison of illustrations of plants shown on the plates in *Zheng lei ben cao* (1249 edn) and those in the first edition of *Ben cao gang mu* (1596), showing that the former were used as models for the latter. Vine (*pu tao* 葡萄): (a1) *Ben cao gang mu* (*fu tu juan zhi xia, guo bu luo lei fu tu* 附圖卷之下, 果部藤類附圖, 15a), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 39); (a2) *Zheng lei ben cao* (*juan* 23, 9b), from Tang Shenwei (1957, p. 463). Jujube (*zao* 棗): (b1) *Ben cao gang mu* (*fu tu juan zhi xia, guo bu wu guo lei fu tu* 附圖卷之下, 果部五果類附圖, 58b), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 32); (b2) *Zheng lei ben cao* (*juan* 23, 7a), from Tang Shenwei (1957, p. 462). Plantain (*che qian zi* 車前子): (c1) *Ben cao gang mu* (*fu tu juan zhi shang, cao bu shi cao lei xia fu tu* 附圖卷之上, 草部濕草類下附圖, 27b); (c2) *Zheng lei ben cao* (*juan* 6, 37a), from Tang Shenwei (1957, p. 159), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 38). Coltsfoot (*kuan dong hua* 款冬花): (d1) *Ben cao gang mu* (*fu tu juan zhi shang, cao bu shi cao lei xia fu tu* 附圖卷之上, 草部濕草類下附圖, 26b), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 27); (d2) *Zheng lei ben cao* (*juan* 6, 20a), from Tang Shenwei (1957, p. 226).

(b2)

(b1)



大秦



(c1)



(c2)

滁州車前子



小兒尿血蜀外疳五分水五合
煎取一合去滓一歲兒百服盡

Fig. 46. (cont.)



Fig. 46. (cont.)

engravings of the first edition of the *Ben cao gang mu*, as they are presented by the reproductions in the reprint produced between 1975 and 1981.²⁵³ A careful study of them nevertheless leads one to wonder whether, behind the roughness of the execution, there may not lie a deliberate attitude. In this case, one would not be presented with naturalistic representations but with sketches designed to be memory-joggers that

²⁵³ This later edition is based on the second edition, known as the 'Jiangxi edition' (Li Shizhen 1975–81, p. 3d) which dates from 1603 and, except for a few tiny exceptions, resembles the Jong-ling edition (Chen Chongming and Huang Shengbai 1988, p. 41). A facsimile edition of the illustrations of the first edition has been published in Japan – Miyashita Saburo (1979a).

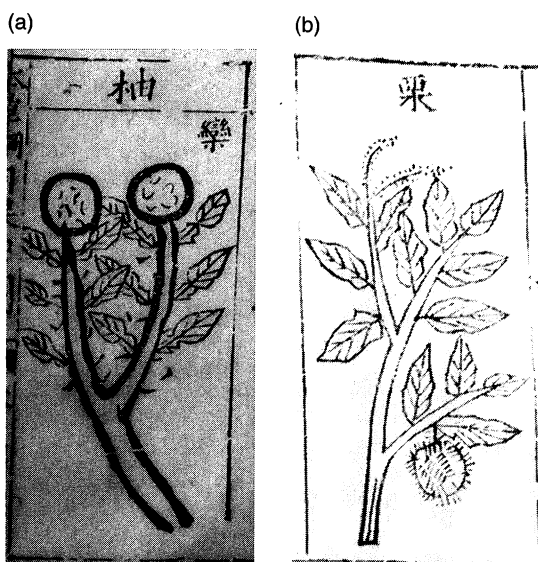


Fig. 47. Demonstration of characteristic morphological details in diagrammatic illustrations of plants featured in the first edition of *Ben cao gang mu* (1596): (a) pomelo (*you* 柚) (*fu tu juan zhi xia, shan guo lei fu tu* 附圖卷之下, 山果類附圖, 60a), cf Li Shizhen (1975–81, Volume 3, *fu tu*, pp. 34, 32); (b) sweet chestnut (*li* 栗) (*fu tu juan zhi xia, wu guo lei fu tu* 附圖卷之下, 五果類附圖, 58b); (c) spindle (*gui jian* 鬼箭) (*fu tu juan zhi xia, mu bu guan mu lei fu tu* 附圖卷之下, 木部灌木類附圖, 74b), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 48); (d) wutong (*wu tong* 梧桐) (*fu tu juan zhi xia, mu bu qiao mu lei fu tu* 附圖卷之下, 木部喬木類附圖, 69b), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 43).

would help a person already familiar with the represented plants (or other natural objects) to find them easily. To this end, in some cases one distinctive morphological detail is emphasised: an enlarged leaf stem for the pommelo (Fig. 47a),²⁵⁴ the male inflorescence of chestnut trees (Fig. 47b), the cork-like appearance of the cortex of a winged euonymus²⁵⁵ (Fig. 47c) or the seeds along the edges of the open follicles of the Chinese parasol tree (Fig. 47d).²⁵⁶ But even with this hypothesis, one remains sceptical when faced with flagrant lacunae. While the rarity of a plant that Li Shizhen may never have seen alive allows one to understand the inversion of the respective positions of the male and female ears on the stem of the maize that is represented (Fig. 48),²⁵⁷ the absence of any detail for a plant as common as the spiderwort (Fig. 49),²⁵⁸ or the numerous faults in a plant as omnipresent in China as shepherd's purse (Fig. 50),²⁵⁹ are harder to justify. If one does assume that Li Shizhen supervised the engraving of

²⁵⁴ *Citrus grandis* (L.) Osbeck.

²⁵⁵ *Evonymus alata* Regel. (= *E. striata* Loes.); Jia Zuzhang and Jia Zushan (1955, Fig. 0816), *wei mao* 衛矛.

²⁵⁶ *Firmiana simplex* Wight. (= *Sterculia platanifolia* L.), *wu tong* 梧桐; Jia Zuzhang and Jia Zushan (1955, Fig. 0724).

²⁵⁷ Probably the first representation of maize in China. On the controversies about the cultivated plants of American origin that were introduced into China, see Métaillé (1992b).

²⁵⁸ *Commelina communis* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 1905), *ya zhi cao* 鴨跖草.

²⁵⁹ *Capsella bursa pastoris* (L.) Medic.; anon. (1972–6, Volume 2, p. 48), *ji cai*. This term, which today unambiguously designates shepherd's purse, in the *ben cao* that were earlier than Li Shizhen had a folk generic use that covered a number of different crucifers with similar aspects and edible uses – shepherd's purse, thlaspi plants and draba plants.

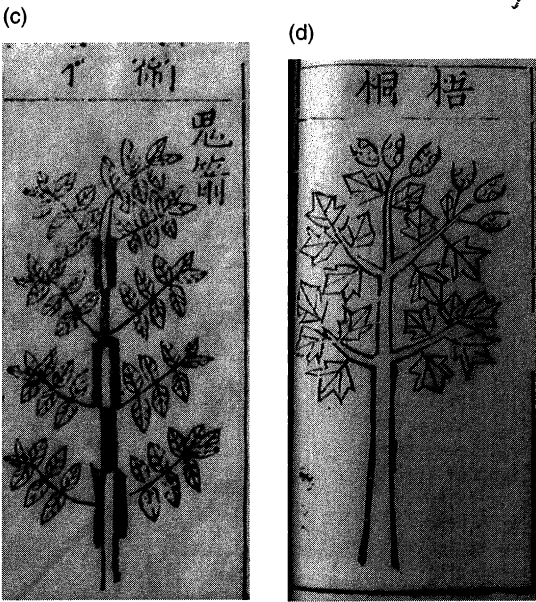


Fig. 47. (cont.)



Fig. 48. In this earliest-known illustration of a maize plant (*yu shu shu* 玉蜀黍), the respective positions of the female and male flowers are reversed (*Ben cao gang mu*, 1596, *fu tu juan zhi shang, gu bu ji su lei fu tu* 附圖卷之上, 穀部稷粟類附圖, 49a), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 22).



Fig. 49. Spiderwort (*ya zhi cao* 鴨跖草), from *Ben cao gang mu* (1596, *fu tu juan zhi shang, cao bu shi cao lei xia fu tu* 附圖卷之上, 草部隰草類下附圖, 25b), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 36).



Fig. 50. The reversal, in the illustration, of the position of the siliculae, so characteristic of shepherd's purse, may suggest a synthetic representation of a folk genus covering several taxa, as indicated in the text from *Ben cao gang mu* (1596, *fu tu juan zhi shang, cai bu ruo hua lei fu tu* 附圖卷之上, 菜部柔滑類附圖, 51a), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 27).

these plates, it is hard to understand how he can have allowed such errors to pass, unless we presume that, having chosen to make his descriptions so detailed, he was perhaps less concerned about the precision of the illustrations.²⁶⁰

Now let us turn to Li Shizhen's successors in the domain of pharmacopoeia. The first is Li Zhongli 李中立 (zi: Shiqiang 士強, hao: Zhengshou 正守). He graduated as 'doctor', *jin shi*, in 1595 and obtained a position as a judge of penalties on the right, *you ping shi* 右評事, in the Dalishi region.²⁶¹ His manner of presenting *materia medica* is very original compared to that of the *Ben cao gang mu*. In the *Ben cao yuan shi*, published in 1612, the illustrations are integrated into the text of the work, as in the *Zheng lei ben cao*, but the major difference is that many of them are accompanied by explanatory captions and, furthermore, they frequently draw attention to morphological details. Finally, as for their style, many of them are striking for their freshness, which seems to me to indicate that they are drawn from nature, as in the case of the datura *man tuo luo* 曼陀羅 (Fig. 51),²⁶² the drawing of which is very clear and is accompanied by a short note indicating the colour of the flower, while the main text simply reproduces Li Shizhen's description, almost word for word. A whole collection of notes surround the image of the spiderwort (Fig. 52), as if to complete the information about it: 'flower in the shape of a butterfly'; 'there are knots on the stem, the seeds are as broad as small beans'; 'if one uses its sap to draw patterns on parchment lamps, [this produces] a blue-green colour that is very pretty'. Similarly, an engraving of a plantain plant (Fig. 53) is surrounded by various captions that tell the reader that 'the ear is like a rat's tail'; 'the leaf resembles an ox's tongue'; 'the plant is gathered on the fifth day of the fifth month, the fruits are gathered in the seventh and eighth months'; 'for preparations, one can use only the plants that have nine leaves with a flowering stem in the middle, which is one foot, two inches tall'. When describing the details of plants, the author often represents only the part of the plant that is used in *materia medica*, as in the case of soya²⁶³ – in which he shows a black soya seed and a shoot of yellow soya (Fig. 54), or in that of the gleditschia, in which he shows only the pods and the thorns (Fig. 55). In the case of *jin jin cai* 堇堇菜, a violet,²⁶⁴ Li Zhongli reproduces the whole text of the *Jiu huang ben cao*. Again, his originality consists in surrounding the image with short glosses that complete it (Fig. 56): 'produces purple flowers, makes capsules with three ridges'; '[when] the capsule is dry, it splits and the seeds fall out'; 'the capsule resembles the tip of an arrow, another name [for *jin jin cai*] is "grass arrowhead"'. The illustrations that are not originals are inspired by the *Zheng lei ben cao*, as in the case of the turnip, *lai fu* 菜菔 (Fig. 57). The major contribution of this work lies in its

²⁶⁰ The practice of favouring texts over images seems to be directly opposed to the choice made by Prince Cesi in the Linx Academy in Rome at the beginning of the 17th century. Freedberg (2002, p. 15), writing on the subject of the representations of plants and animals produced within the framework of the research of members of this group, declares that these were 'the finest natural historical drawings I had ever seen'.

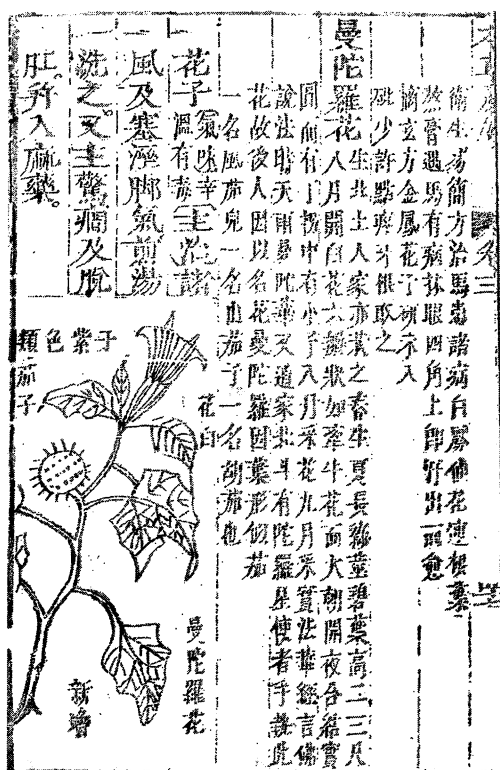
²⁶¹ Okanishi Tameto (1977, p. 241).

²⁶² *Datura alba* Nees.; Jia Zuzhang and Jia Zushan (1955, Fig. 0298).

²⁶³ *Da dou* 大豆, *Glycine max* (L.) Merv.; Jia Zuzhang and Jia Zushan (1955, Fig. 0989).

²⁶⁴ Possibly *Viola phalacrocarpa* Maxim.; anon. (1972–6, Volume 2, p. 919).

(a)



(b)



Fig. 51. *Datura* (*man tuo luo hua* 曼陀羅花): (a) in *Ben cao yuan shi* (1612, *juan* 3, p. 47b); (b) in the first edition of *Ben cao gang mu* (1596, *fu tu juan zhi shang, cao bu du cao lei fu tu* 附圖卷之上, 草部毒草類附圖, 33b). Cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 44).

use of iconography, for the texts are simply borrowings from its predecessors. When comparing these engravings to the plates of the *Ben cao gang mu*, one is bound, once again, to remain perplexed as to the inexactness of the latter, as in the case of the ginkgo, *yin xing* 銀杏 (Fig. 58a, b), and the walnut tree, *hu tao* 胡桃 (Fig. 59a, b), for example. This print no doubt became widespread very early on since, once the collection of engravings of the first edition of the *Ben cao gang mu* had been reproduced several times,²⁶⁵ by 1640 it is clear that innovations were introduced into the original illustrations in an edition produced in Hangzhou that was called 'the Qian edition' after the name of the publisher, Qian Weiqi. The illustrated supplement to this edition, in three *juan*, consists of 1,110 plates; that is to say, one more than in the original edition. Out of this whole collection, 800 plates had been modified. This series of engravings certainly played a by no means negligible role in the history of illustration, since it was reproduced at least thirty-five times right

²⁶⁵ Bearing in mind the uncertainty that surrounds some of the dates, there were between three and six new editions before 1640 (according to Chen Chongming and Huang Shenbai 1988, p. 41).



Fig. 52. Spiderwort (*ya zhi cao* 鴨跖草) in *Ben cao yuan shi* (1612, *juan* 3, 39a). Compare with the illustration of the same plant in the *Ben cao gang mu*, 1596 edn (Fig. 49 above), and the 1885 edn (Fig. 61 below). See also Fig. 165 below.

down to the 20th century.²⁶⁶ It appears, in particular, in the *Si ku quan shu*. However, throughout this long period, there were no spectacular changes: the style of the engravings remained unchanged while the graphic quality of the representations of *materia medica* varied no more than slightly from one edition to the next. However, a real transformation of the illustrated supplement to the *Ben cao gang mu* was introduced in an edition produced in 1885 in Hofei, known as 'the Zhang edition', named after its sponsor, Zhang Shaotang 張紹棠. This supplement, also in three *juan*, included 1,122 plates, engraved from the drawings that Xu Gongfu 許功甫 produced, inspired partly by the engravings of the 1640 edition of the *Ben cao gang mu* and those of the *Zhi wu ming shi tu kao* and the *Jiu huang ben cao*, but also by drawings from nature of plants in the mountains in south-western Jiangsu.²⁶⁷

²⁶⁶ In twenty-two different editions – some of which were reprinted several times (see Chen Chongming and Huang Shengbai 1988, p. 41).

²⁶⁷ Xie Zongwan (1985, pp. 146–7), Chen Chongming and Huang Shengbai (1988, p. 42).



Fig. 53. Plantain (*che qian zi* 車前子), in *Ben cao yuan shi* (1612, *juan* 1, 3b).

Where the engravings are concerned, then, the fifty or so editions²⁶⁸ of the *Ben cao gang mu* can be grouped into three major collections:²⁶⁹ the first comprises reprints of the first edition, completed in 1596 and known as the 'Jin-ling edition', after the name of the town where it was published, now Nanjing; the second comprises the books that reproduced the 1640 edition produced in Hangzhou, the Qian edition; and the third comprises the works that are reproductions of the Zhang edition. From a purely aesthetic point of view, the illustrations of the two later editions seem more elegant, but, where the scientific value of the engravings is concerned, each case should be analysed separately. The example of maize shows how, while improving the representation of the female ear in comparison to the original image (Fig. 60a), the Qian edition at the same time aggravated the error of the latter – namely the inversion of the male and the female ears – by purely and simply

²⁶⁸ This number relates solely to China, according to Chen Chongming and Huang Shengbai (1988, pp. 41–2), and Ma Jixing and Hu Naichang (1985).

²⁶⁹ Xie Zongwan (1985, pp. 146–7).

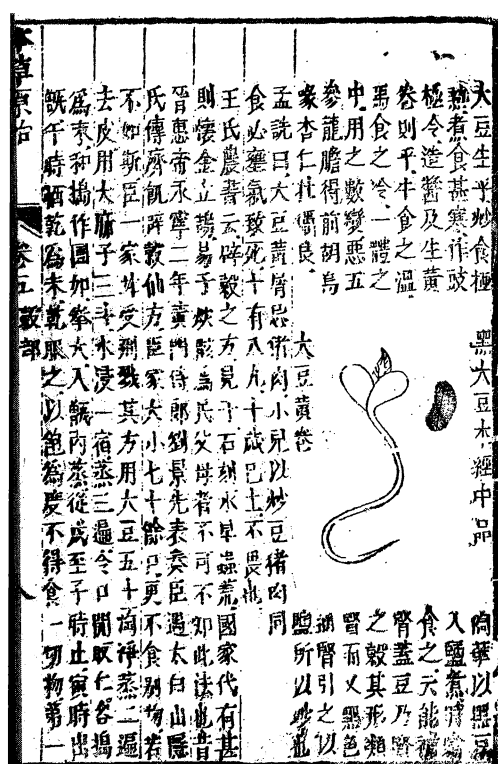


Fig. 54. Soya (*da dou* 大豆), seed and sprout, in *Ben cao yuan shi* (1612, *juan* 5, 8a).

suppressing the male inflorescence and retaining only one ear at the top of the stem (Fig. 60b).²⁷⁰ Finally, it was not until 1885 that a correct representation of the male and the female ears of the plant, copied from the *Zhi wu ming shi tu kao*, was to be introduced into the pharmacopoeia (Fig. 60c).²⁷¹ For the spiderwort, *ya zhi cao* (Figs. 49; 61a, b),²⁷² the second edition certainly reproduces the aspect of the plant more accurately, from a botanical point of view, while the Zhang edition simply improves the quality of the drawing. As for shepherd's purse,²⁷³ starting from a first 'generic' drawing (Fig. 50) the botanical precision of the image improved in the Qian edition, in which the shape of the siliculas is more accurate and their

²⁷⁰ This representation, which remained unchallenged until the 19th century, may indicate that, until then, maize was better known in the form of an ear than in that of a plant.

²⁷¹ This may have been the first time in Chinese literature, for the two illustrations of maize that appear in the *Tu shu ji cheng* (1727) and the great treatise on agriculture, *Shou shi tong kao* (Compendium of Works and Days), completed in 1742 under the direction of Hu-Er-Tai, were simply inspired, respectively, by the Jin-ling and Qian editions of the *Ben cao gang mu*. On the *Shou shi tong kao*, see *SCC* Volume 6, Part II, in particular pp. 42–4. It should be noted that the illustration correctly representing a maize plant that appears on p. 508 of the later edition, anon. (1963b), is not that of the original edition.

²⁷² *Commelina communis* L., *ya zhi cao*; Jia Zuzhang and Jia Zushan (1955, Fig. 1905).

²⁷³ *Capsella bursapastoris* Moench., *ji cai*; Jia Zuzhang and Jia Zushan (1955, Fig. 1272).

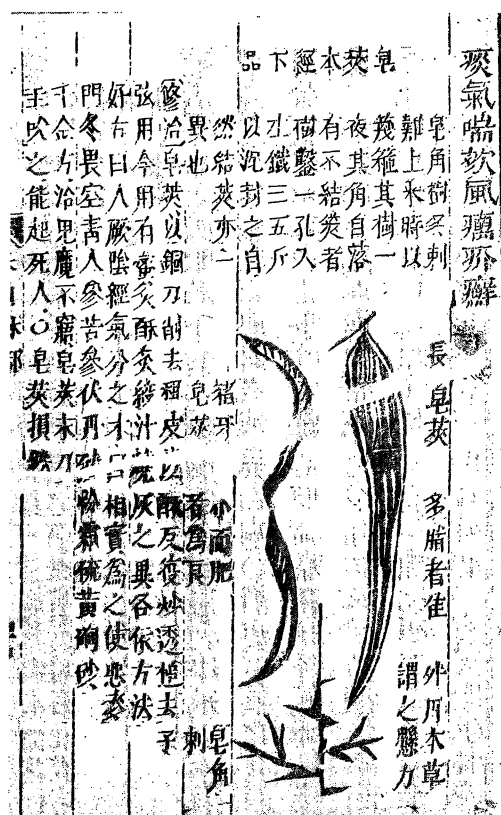


Fig. 55. Pod and thorns of Chinese honey locust (*zao jia* 皂莢), in *Ben cao yuan shi* (1612, *juan* 4, 47a).

orientation is corrected (Fig. 62a). Despite this, in respect both of the shape and disposition of the leaves and of the insertion of the siliculas on the stem, the representation still provides an incorrect interpretation of the plant. In the end, it was the 1885 edition that – once again through the intermediary of the *Zhi wu ming shi tu kao* (Fig. 63) – truly provided an illustration that ruled out any doubt about the identification of *ji cai* with shepherd's purse (Fig. 62b). One might conclude from these few examples that the scientific quality of the illustration of the *Ben cao gang mu* noticeably improved in the course of the various editions of the work. Although, from the point of view of the execution, it is clear that the images are of a better quality, for the Zhang edition offers many very fine drawings, one is forced to introduce a note of qualification to one's appreciation as soon as one studies the relation between the text and the illustration. The first judgement passed, during the Cultural Revolution, is categorical:²⁷⁴ Zhang Shaodang, a military man and a

²⁷⁴ Huang Shengbai and Chen Chongming (1975).



Fig. 56. Violet (*jūn jūn cài* 莖莖菜), in *Ben cao yuan shi* (1612, *juan* 6, 17b).

rich landowner ‘whose hands dripped with the fresh blood of the working people’, was said to have produced this edition of the *Ben cao gang mu* only so that his crimes might be forgotten, but in doing so he only made his position worse, for he introduced modifications and additions that generated errors that included forty-two ‘grave mistakes’.²⁷⁵ If, after totting up the number of errors introduced, one undertakes a reverse exercise, the example of maize shows that his interventions also corrected certain mistakes. The truth is that a more nuanced analysis shows that in some cases the modifications introduced did make an identification clearer,²⁷⁶ but in others they did indeed introduce confusion. For example, on the subject of *jue* 蕨, Li Shizhen wrote,²⁷⁷

Today, these are everywhere in the mountains. In the second and third months the germ grows; it looks rolled up, like a child’s fist. As it grows it unfurls like the tail of a phoenix and reaches three or four feet. The stem is gathered while it is tender, it is boiled with ash in

²⁷⁵ The case of *ji xue cao*, soon to be presented, provides an example. ²⁷⁶ Xie Zongwan (1985).

²⁷⁷ At *juan* 27, *cái: rou hua lei* – ‘vegetables: mucilaginous category’. See Li Shizhen (1975–81, p. 1668).



Fig. 57. Turnip (*lai fu* 萊菔), in *Ben cao yuan shi* (1612, juan 6, 7a).

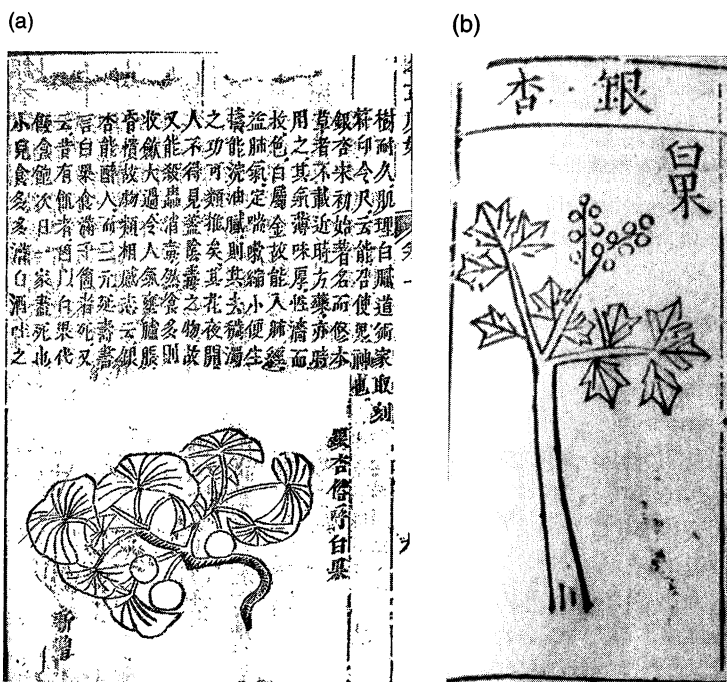


Fig. 58. Ginkgo (*yin xing* 銀杏): (a) in *Ben cao yuan shi* (1612, juan 7, 9a); (b) in *Ben cao gang mu* (1596, fu tu juan zhi xia, guo bu shan guo lei fu tu 附圖卷之下, 果部山果類附圖, 60b). Cf Li Shizhen (1975–81, Volume 3, fu tu, p. 35).



Fig. 59. Walnut tree (*hu tao* 胡桃): (a) in *Ben cao yuan shi* (1612, *juan* 7, 35a); (b) in *Ben cao gang mu* (1596, *fu tu juan zhi xia*, *guo bu shan guo lei fu tu* 附圖卷之下, 果部山果類附圖, 60b). Cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 35).

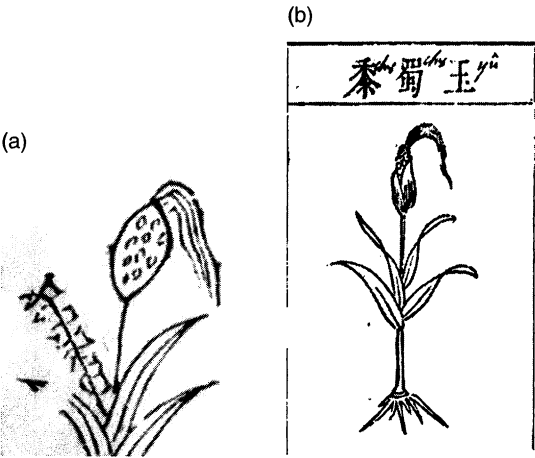


Fig. 60. Maize (*yu shu shu* 玉蜀黍): (a) detail from the 1596 edition of *Ben cao gang mu*, cf Fig. 48 above; (b) the whole plant, in the 1640 edition of *Ben cao gang mu* (*Tu, juan zhong* 卷中, 24a); (c) in the 1885 edition of *Ben cao gang mu* (*Tu, juan zhong* 卷中, 24b).

(c)



Fig. 60. (cont.)

order to remove the stickiness; once dried it is used as a mucilaginous vegetable with a sweet taste; it can also be eaten with vinegar. Its root is a purplish colour and inside the cortex there is a white powder . . .

The plant thus described is nowadays identified as a kind of common bracken or female fern.²⁷⁸ If, as is likely, the engraving of the first edition (Fig. 64) refers to another type of bracken, the engraving to be found in the Qian edition (Fig. 65) simply repeats it.²⁷⁹ The illustration in the Zhang edition (Fig. 67) seems, in this case, to be the only correct one. A similar case is provided by the dandelion (Figs. 68, 69, 70).²⁸⁰ Another plant that Li Shizhen considered to be a rambling mint, *jī xuě cǎo* 積雪草, received an identical illustration in both of the earlier editions (Figs. 71, 72), whereas in Zhang's edition it is completely different (Fig. 73). On the basis of Li

²⁷⁸ *Pteridium aquilinum* (L.) Kuhn var. *latiusculum* (Desv.) and Underw. See anon. (1972–6, Volume 1, p. 148). It is interesting to note that the second dietary use described by Li Shizhen still exists today in Japan, where these ferns, prepared in this way, are an ingredient in the *tsukemono* (pickles) that accompany rice dishes.

²⁷⁹ Except in the edition of the *Sì kù quán shū* where, as a result of an inversion, an image of a composite plant appears under the title *jūe*, while the image of the fern appears under *wǒ jū* 葛苣 and vice versa (Fig. 66a, b).

²⁸⁰ *Taraxacum mongolicum* Hand. Mazz.; anon. (1972–6, Volume 4, p. 680).



Fig. 61. Spiderwort (*ya zhi cao* 鴨跖草), in the 1885 edition of *Ben cao gang mu* (*Tu, juan shang* 卷上, 38a), cf Figs. 49, 52 above.

Shizhen's comparison with a mint and the fact that the various authors that he cites all emphasise the shape of the leaves, 'which are as round as coins', one is tempted to consider it a labiate with round leaves, hence its identification with *Glechoma longituba* (Nakai) Kupr.,²⁸¹ whereas, following the *Zhi wu ming shi tu kao*, Zhang's edition makes a different choice, which leads to the identification of the plant as an umbellifer, a view that is shared by the editors of two modern Chinese floras.²⁸² I shall not attempt to resolve the matter here but the difficulty encountered by a variety of authors over close on five centuries suggests that we should take a better look at what Li Shizhen says about this plant and also at the first representation of it that is provided. Basing his opinion upon the views of Su Ying and Su Gong, he considers that '*ji xue cao* is "the mint of barbarians" (*hu bo he* 胡薄荷), the one that, among the mints, is creeping'.²⁸³ It seems to me that the drawing that accompanies

²⁸¹ By Xie Zongwan (1985, p. 170).

²⁸² *Centella asiatica* (L.) Urban; cf Jia Zuzhang and Jia Zushan (1955, Fig. 0558), and anon. (1972-6, Volume 2, p. 1049).

²⁸³ Li Shizhen (1975-81, Volume 2, p. 919).

(a)



(b)



Fig. 62. Shepherd's purse (*jī cai* 薺菜): (a) in the 1640 edition of *Ben cao gang mu* (*Tu, juan zhong* 卷中, 30a); (b) in the 1885 edition of *Ben cao gang mu* (*Tu, juan zhong* 卷中, 30a), cf the image in the 1596 edition, Fig. 50 above.



Fig. 63. Shepherd's purse, in *Zhi wu ming shi tu kao* (Wu Qijun 1848, *juan* 3, p. 46a).



Fig. 64. Fern (*jue* 蕨), in the *Ben cao gang mu* (1596, *fu tu juan zhi shang, cai bu ruo hua lei fu tu* 附圖卷之上, 菜部柔滑類附圖, 54b), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 28).



Fig. 65. Fern, in the *Ben cao gang mu* (1640, *Tu, juan zhong* 卷中, 32a).

the first edition is a response to that remark and is inspired by the image that illustrates *bo he* 薄荷, a mint that is very common in China, was widely cultivated in the period of Li Shizhen,²⁸⁴ and is cited in the category of ‘fragrant herbs’ in *juan* 14 of the *Ben cao gang mu*, immediately before *ji xue cao*. A comparison between the two engravings speaks for itself (Figs. 71 and 74): it is clear that the shape of the leaves, ‘as round as coins’, another distinctive characteristic of the plant, is not taken into account at all in the original edition. In contrast, it is certainly upon that morphological particularity that Wu Qijun and modern botanists have focused. The case of the datura, *man tuo luo* 曼陀羅 (Figs. 51b and 75), also shows that sometimes no modifications are introduced in the course of several editions (Figs. 76, 77), despite the clearly deficient nature of the initial illustration, even though, in the *Ben cao yuan shi* by Li Zhongli, at least, there was an excellent representation (Fig. 51) of the plant. Finally, one also comes across certain images that have survived without any change throughout the eight or so centuries that separate Zhang’s edition of the

²⁸⁴ Identified as *Mentha arvensis* L. (Jia Zuzhang and Jia Zushan 1955, Fig. 0337); Read (1936, Fig. 129), *Mentha arvensis* L. var. *piperezens* Malinv. (Makino Tomitaro 1970, p. 536); and, for the wild form, *Mentha haplocalyx* Briq. = *M. arvensis* auct. non L. (anon. 1972–6, Volume 3, p. 680).

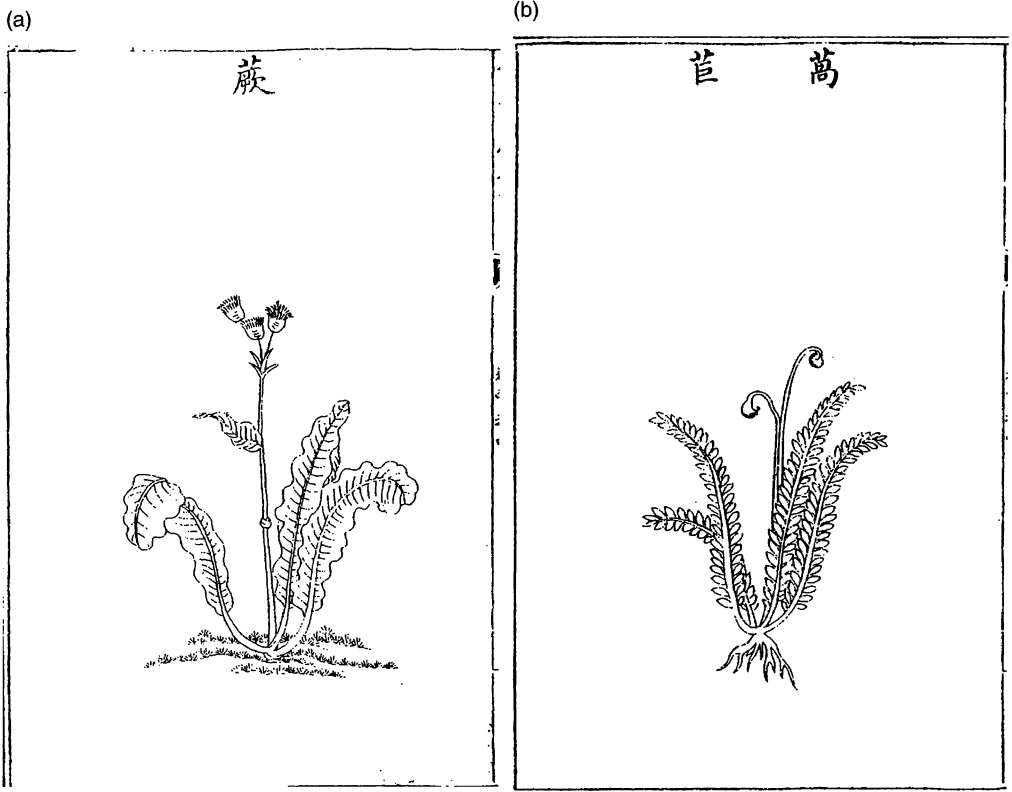


Fig. 66. (a) Lettuce shown under the title *jue* 蕒, 'fern', in the *Sì kù quán shū* edition of the 1640 edition of *Ben cao gang mu* (*Tu, juan zhong zhi zhong* 卷中之中, 46b); (b) fern shown under the title *wo ju* 莴苣, 'lettuce', in the same work (*Tu, juan zhong zhi zhong* 卷中之中, 50b).

Ben cao gang mu from that of the *Ben cao tu jing*, such as the image of coltsfoot.²⁸⁵ Now, after that incursion into what became of the *Ben cao gang mu*, let us return to the end of the 16th century. The way in which Li Shizhen proceeded in his investigations of the products used for medicinal purposes – citing earlier authors and then giving his own point of view – led him, de facto, to list the ways of describing natural products and, therefore, also the terminology used for that purpose. In doing so, among the hundreds of references to texts that he cites at the beginning of the *Ben cao gang mu*, he seems to have privileged the descriptions of Su Song's *Ben cao tu jing*, which, in certain cases, he is content to cite without adding any remarks of his own. It also seems – as numerous passages attest – that he was not content to base his entire research on books: in particular, his study of the

²⁸⁵ *Kuan dong hua* 款冬花, *Tussilago farfara* L., according to Read (1936, Fig. 49) and anon. (1972–6, Volume 4, p. 547, Fig. 32). (Fig. 78).



Fig. 67. Fern (*jue* 蕨), in the *Ben cao gang mu* (1885, *Tu, juan zhong* 卷中 32a).

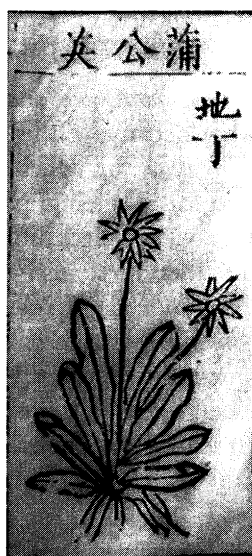


Fig. 68. Dandelion (*pu gong ying* 蒲公英), in the *Ben cao gang mu* (1596, *fu tu juan zhi shang, cai bu ruo hua lei fu tu* 附圖卷之上, 菜部柔滑類附圖, 54a), cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 28).



Fig. 69. Dandelion (*pú gōng yīng* 蒲公英), in the *Ben cao gang mu* (1640, *Tu, juan zhong* 卷中, 31b).



Fig. 70. Dandelion (*pú gōng yīng* 蒲公英), in the *Ben cao gang mu* (1885, *Tu, juan zhong* 卷中 31b).

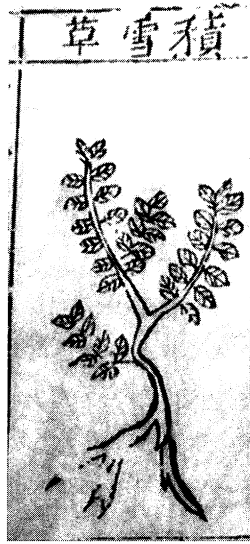


Fig. 71. Rambling mint (*ji xue cao* 積雪草), in the *Ben cao gang mu* (1596, *fu tu juan zhi shang* 附圖卷之上, 草部芳草類附圖, 19a), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 29).

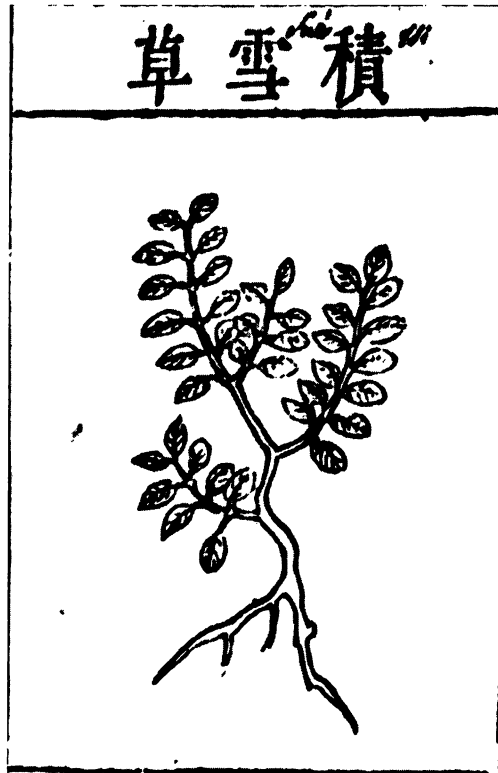


Fig. 72. Rambling mint (*ji xue cao* 積雪草), in the *Ben cao gang mu* (1640, *Tu, juan shang* 卷上, 29a).

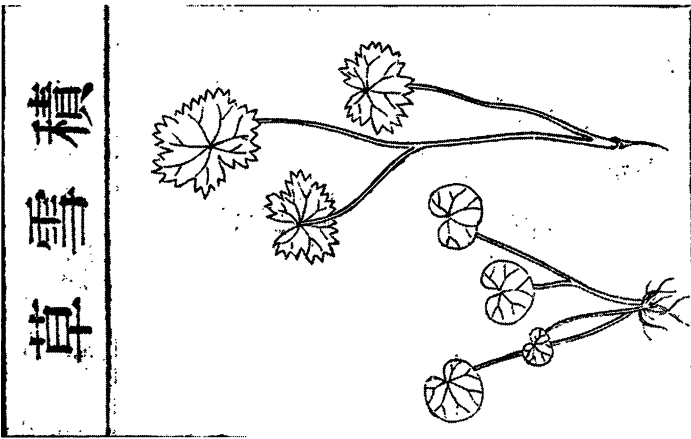


Fig. 73. Rambling mint (*jī xuě cǎo* 積雪草), in the *Ben cao gang mu* (1885, *Tu, juan shang* 卷上, 29a).

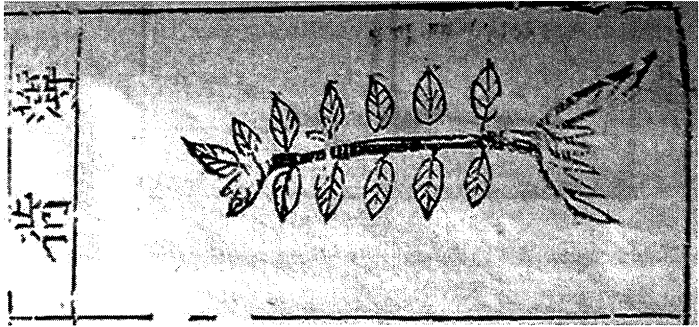


Fig. 74. Mint (*bō hé* 薄荷), in the *Ben cao gang mu* (1596, *fu tu juan zhi shang* 附圖卷之上, 草部芳草類附圖, 19a), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 29).

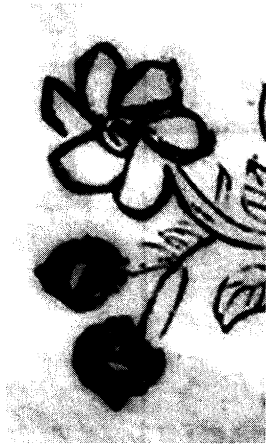


Fig. 75. Datura (*mán tuō huā* 曼陀羅花), in the *Ben cao gang mu* (1596, *fu tu juan zhi shang, cao bu du cao lei fu tu* 附圖卷之上, 草部毒草類附圖, 33b), detail of the flower; see also Fig. 51b above.



Fig. 76. *Datura* (*man tuo luo hua* 曼陀羅花), in the *Ben cao gang mu* (1640, *Tu, juan shang* 卷上, 49b).

investigation into the nature of things²⁸⁶ no doubt led him to take an interest in popular customs.²⁸⁷ His text, reproduced in the form of citations from works as different from one another as the *Qun fang pu* by Wang Xiangjin, the *Hua jing* by Chen Haozi, the *Cao mu dian* section of the great *Tu shu ji cheng* encyclopaedia and even, in the 19th century, the *Zhi wu ming shi tu kao* by Wu Qijun, has thus progressively established itself as a necessary reference in the domain of the study of natural objects and, in particular, plants. This is particularly true of the domain of pharmacopoeia but it is worth noting that this literature privileged

²⁸⁶ *Gewu zhi xue*. See Li Shizhen (1975–81, *fan li*, Volume 1, p. 34).

²⁸⁷ The need for this is almost a leitmotif among neo-Confucian literati. Already in the *Kun chong cao mu lie* 昆蟲草木略, Zheng Qiao 鄭樵 (1103–62), registering the ignorance about natural things on the part of the Confucian literati and the ignorance of books on the part of country folk, reckoned that, without co-operation between these two groups, the study of plants and animals could not succeed. So, in his view, a deep understanding of the ancient texts needed to be accompanied not only by a philological enquiry but also by an enquiry in the countryside and mountain regions, among the people who lived close to nature. In the 18th century, a man such as Cheng Yaotian would likewise proceed in such a manner. See p. 127 above, and Métaillé (1992a).

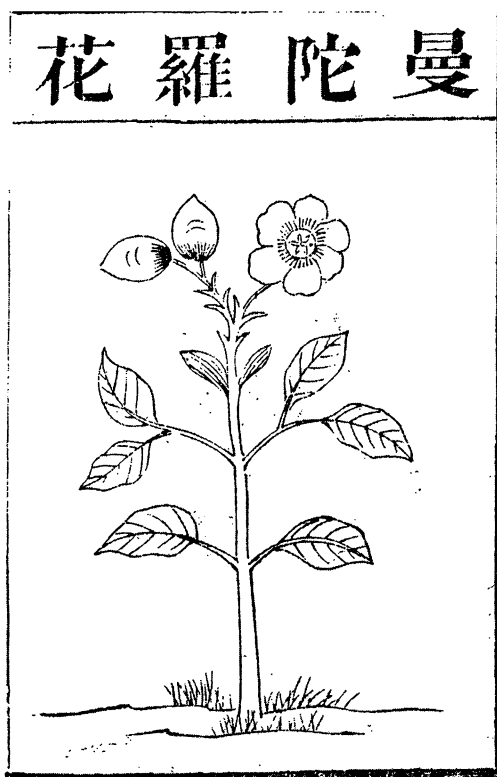


Fig. 77. *Datura* (*man tuo luo hua* 曼陀羅花), in the *Ben cao gang mu* (1885, *Tu, juan shang* 卷上, 49b).

pharmacological practices without showing any interest in the naturalist aspect of *materia medica* as Li Shizhen and Li Zhongli had done.²⁸⁸ The very presentation of various works testifies to this: in the *Ben cao [gang mu] qiu zhen* 本草求真 by Huang Gongxiu 黃宮綉 (1769), *materia medica* is classified by therapeutic factors. The *Ben cao bei yao* 本草備要 by Wang Ang 汪昂 (1694) and also the *Ben cao cong xin* 本草從新 by Wu Yiluo 吳儀洛 (1757) first classify the products of *materia medica*: the lotus is thus treated to a number of different rubrics that encourage investigation into the way in which this plant was perceived. No particular description is indicated in the three works we are dealing with, but the *Ben cao bei yao* devotes four rubrics to the plant: the seed, *lian zi*; the stamen and the anther, *lian rui xu*; the nodes, *ou jie*; and the leaf, *he ye*. The *Ben cao cong xin* adds to the four above the rhizome, *ou*, as a separate entry, while the *Ben cao qiu zhen* reverts to four rubrics: the stamen, *lian xu*; the seed, *lian zi*; the leaf, *he ye*; and the rhizome, *lian ou*. In the *Zhi wu ming shi tu kao* (1848), a

²⁸⁸ Except by Ni Zhumo, in his *Ben cao hui yan*, published in Zhejiang in 1624 and republished in 1645 (Okanishi Tameto 1977, p. 244). For a modern facsimile edition, see Ni Zhumo (1996).

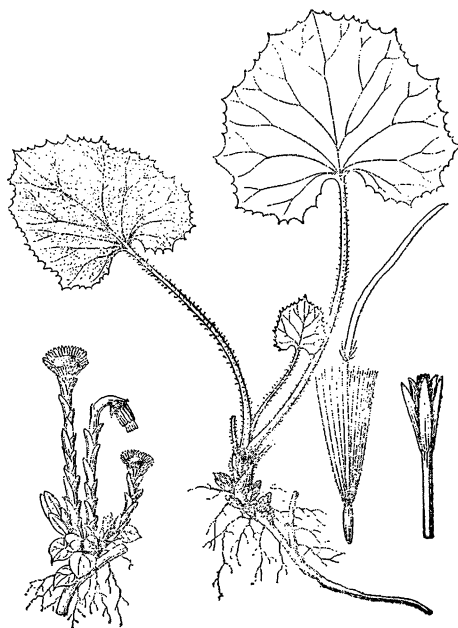


Fig. 78. Coltsfoot (*kuan dong hua* 款冬花, *Tussilago farfara*, L.), from anon. (1972–6, Volume 4, p. 547); see also Fig. 46d above.

representation of a leaf, a flower, a sectioned rhizome and a receptacle surrounded by stamens is accompanied by the following short text: ‘seed (*shi*), germ (*yi*), anther (*ru*), stamen (*xu*), receptacle (*hua fang*), leaf (*ye*), nose [the petiole’s link to the leaf] (*bi*) are all medicinal’. With this list that reminds us that a simple recital of the names of the constituent elements of an object is in itself a descriptive procedure often used in China,²⁸⁹ we shall now leave the domain of *materia medica* and return to ten or so years after the first edition of the *Ben cao gang mu*, to consider the last chapters of the *San cai tu hui* 三才圖繪 encyclopaedia (the Universal Encyclopaedia),²⁹⁰ published in 1609.

The interest of this part of the book lies first in its form, which strictly associates illustrations and text in a way that is comparable to that of the *Jiu huang ben cao*. In general, every entry is allotted two pages, one for a drawing, the other for the corresponding text. In a few cases a brief text appears only on the illustrated page. The descriptive text that accompanies each of the engravings usually repeats the text of the *Ben cao tu jing* in cases where the plants have been mentioned in that book. The same goes for the illustrations, except for one innovation. Whereas the original illustration usually presented each plant out of the soil, and so with its roots visible – in particular in the case of herbaceous plants – the engravings of the *San cai tu hui* are mostly presented

²⁸⁹ On this point, see Jullien (1990).

²⁹⁰ See the description of this work, pp. 23–5 above.

(a)



Fig. 79. *Inula* (*xuan fu hua* 旋復花): (a) in *Zheng lei ben cao* (1249, *juan* 10, 21a), from Tang Shenwei (1957, p. 251); (b) in *San cai tu hui* (1609, *juan zhi cao mu* 4 卷之草木四, 10a), cf 1988 edn, Volume 3, p. 2362.

as little pictorial compositions, the plant being in many cases associated with a rock or, at the very least, emerging from the earth. But this aesthetic concern does not rule out botanical errors. Although the representation of an inula, *xuan fu hua* 旋復花,²⁹¹ possesses a certain elegance (Fig. 79b), the details in the drawing are misleading and, in this case, the engraving of the *Zheng lei ben cao* is a representation that is more faithful to the plant (Fig. 79a).²⁹² A plant that did not figure in the *Ben cao tu jing*, a jasmine, *mo li* 茉莉

²⁹¹ *Inula britannica* L. (Jia Zuzhang and Jia Zushan 1955, Fig. 0103), in Wang Qi and Wang Siyi (1988, Volume 3, p. 2362).

²⁹² Cf Tang Shenwei (1957, p. 251).

(b)



2384

Fig. 79. (cont.)

莉,²⁹³ makes it possible to compare the respective choices of the authors of the *Ben cao gang mu* and the *San cai tu hui*. Li Shizhen first points out that, because of the foreign origin of the name, there is, in Chinese, no official orthography to transcribe *mo li*. He then goes on as follows:

Jasmine, which comes from Persia, has been transplanted in regions of the south, and today is cultivated in Yunnan and Guangdong. It fears the cold, so the plains of central China do not suit it. Its stem is weak and very ramified and the leaves are green with rounded tips. In early summer, it produces small white flowers with double petals and no anthers; these fall in the autumn and no fruit is produced. There are [varieties] with double flowers and with red, climbing flowers. The flowers all open at night-time and their smell is agreeable. Women decorate their hair with them or mix them with their make-up. It is also possible to infuse them with tea or, by steaming them, to extract a liquid that may replace rosewater.

²⁹³ *Jasminum sambac* Ait.; Jia Zuzhang and Jia Zushan (1955, Fig. 0457). On the history of its introduction into China, see Laufer (1919, pp. 329–33).

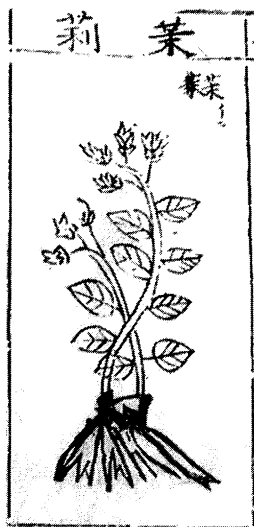


Fig. 80. Jasmine (*mo lì* 茉莉), in *Ben cao gang mu* (1596, *fu tu juan zhi shang* 附圖卷之上, 草部芳草類附圖, 17b), cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 28).

There is also [a plant] that resembles jasmine but with larger petals and a very pure perfume, known as ‘dogs’ teeth’ or ‘snow petals’. It is found in the southern provinces.²⁹⁴

The authors of the *San cai tu hui* have this to say:

Jasmine can be found in Guangzhong and Fujian. It may be yellow or red. It can be used for hedges that may last for two or three years, but it fears the east wind. [Su] Dongpo considers it to be like a ‘deep musk’, Duan Bo 端伯²⁹⁵ calls it an ‘elegant friend’. According to the *Ge wu cong hua* 格物叢話, the leaf is not indented and its surface is slightly undulating. By nature, jasmine likes warm regions. The people of the south cultivate it in small fields. It flowers between the summer and the autumn, being in full flower in the sixth and seventh months.²⁹⁶

The text of the *San cai tu hui* was written without reference to the *Ben cao gang mu*, which the authors may not have known about. The two works, furthermore, do belong to very different domains, but the excerpts above show that their authors shared very similar interests. Where differences are concerned, the presentation is more thematic in Li Shizhen’s work and, in his ‘explanations’, his preoccupations are philological, naturalist and ethnographic, whereas Wang Siyi, who seems to juxtapose citations, also introduces a poetic dimension to the plant. As for the two engravings (Figs. 80, 81), although they are comparable in the botanical information

²⁹⁴ Li Shizhen (1975–81, Volume 2, p. 895).

²⁹⁵ The Buddhist name of Li Zhichun 李之純, a scholar who lived in the late 11th century and is frequently cited in the *San cai tu hui*.

²⁹⁶ Wang Qi and Wang Siyi (1988, p. 2538).



Fig. 81. Jasmine (*moli* 茉莉), in *San cai tu hui* (1609, *juan zhi cao mu* 2 卷之草木二, 9a), cf 1988 edn (Volume 3, p. 2538).

that they provide, they are noticeably different in style, with that of the *San cai tu hui* certainly confirming an aesthetic preoccupation.

Although this encyclopaedia owes nothing to the *Ben cao gang mu*, horticultural literature, on the contrary, discovered in Li Shizhen a rich source of inspiration, as the example of the description of ginger in the *Qun fang pu* has already shown.²⁹⁷ And what of the illustrations? Two other horticultural treatises will help to answer that question. The *Pei hua ao jue lu* 培花奧訣錄 by Sun Zhibo 孫知伯, published in 1640,²⁹⁸ contains forty-two engraved plates representing ornamental plants. The very sight of them confirms that printing techniques in 17th-century China made it possible to produce representations of plants that were both elegant and faithful – as, indeed, had already been shown one century earlier by the reprinted *Jiu huang ben cao*. The problem of the graphic quality of engravings, therefore, seems to me to be linked not to technical constraints but rather to the talent of the artists and engravers involved, and so, ultimately, to

²⁹⁷ See p. 28 above.

²⁹⁸ According to Jiang Ying (1980b, p. 64). See p. 436 below.



Fig. 82. *Gardenia* (zhi zi 梔子), in *Pei hua ao jue lu* (1640, 18a).

editorial choices.²⁹⁹ A comparison of a few plates from the *Pei hua ao jue lu* (Figs. 82, 84) with those representing the same plants taken from the Qian edition of the *Ben cao gang mu* (Figs. 83, 85), which dates from the same year, is very significant. The anonymous author of the drawings from which the plates of the horticultural treatise were engraved seems to be a painter trying to convey the essence of each of the plants, over and above merely their morphology. The grace of the lines, associated with technical procedures such as the use of black to create, by contrast, an impression of depth in the image, confers an illusion of life to each of the engravings of plants. Even if an analogous technique was used for the engravings of the *Ben cao gang mu*, the image nevertheless appears more static. The texts, too, present great originality in comparison to the *Ben cao gang*

²⁹⁹ To appreciate the quality achieved by book illustration under the Ming, see Takimoto Hiroyuki (1988, in particular pp. 150 ff.). On wood engravings, see Bussotti (2007).



Fig. 83. Gardenia (*zhi zi* 梔子), in *Ben cao gang mu* (1640, *mu bu guan mu tu* 木部灌木圖, *juan xia* 卷下, 7b).

mu, as, indeed, they do in comparison to other horticultural treatises.³⁰⁰ The second treatise, published in 1688, the *Hua jing* 花鏡 (Mirror of Flowers) by Chen Haozi 陳淞子, presents nearly 300 plants accompanied by illustrations.³⁰¹ The striking similarity of some of the engravings (Fig. 86) with those found in the 1640 edition of the *Ben cao gang mu* (Fig. 87) leads one to believe that the former is copied from the latter, and a comparison of the two texts tends to confirm this. Even if Chen Haozi hardly mentions Li Shizhen, it nevertheless seems that the *Ben cao gang mu* exerted a significant influence upon his work, as can be seen by comparing their respective passages on the wintersweet, *la mei* 臘梅.³⁰² Let us begin with Chen Haozi:

[Popularly called *la mei* 臘梅] another name is 'yellow Japanese apricot tree' (*huang mei* 黃梅). In reality, it does not belong to the category of the *mei* 梅, but as it opens at the same time and its perfume is similar, and it also has the colour of wax (*mi la* 蜜蠟) and flowers in

³⁰⁰ See my analysis, p. 436 below.

³⁰¹ See p. 477 below for a description of this book.

³⁰² *Chimonanthus praecox* (L.) Link. (anon. 1972-6, Volume 1, p. 804) (= *Meralia praecox* Rehd. and Wils., *Cabycanthus praecox* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 1338)). See Chen Haozi (1962, pp. 100-1).



Fig. 84. *Magnolia* (*xin yi* 辛夷), in *Pei hua ao jue lu* (1640, 15b).

the twelfth month (*la yue* 臘月), it has been given this name. The tree is not very big but has bushy branches. The leaves resemble those of the peach tree but are larger and thicker. There are three varieties: *qing kou* 磬口, *he hua* 荷花 and *gou ying* 狗英.³⁰³ The flowers, which have round petals of a deep yellow, similar in shape to those of the white Japanese apricot tree (*bai mei* 白梅), and which, although fully blooming, seem to be only half-open, are called *qing kou* and they are most appreciated. One branch in a vase is enough to perfume a room. *Kou ying* is also perfumed but is inferior in colour and aspect. The *he hua*, 'lotus flowers', have petals that are almost round but slightly more pointed than those of lotus flowers. Only those produced entirely by grafting or cuttings from the *gou ying* have the characteristics of the *gou ying*; otherwise, the plants obtained by seeding have small flowers,

³⁰³ The first term refers to the form of a corolla, which is compared to the bronze bowl that is struck as an accompaniment to the recitation of the prayers of Buddhist monks. The second term means 'lotus flower'; the third, 'dog-petal', probably associates the aspect and colour of the petals with the ivory of dogs' teeth. The next note helps a reader to appreciate the shift of meaning engineered by Chen Haozi in connection with the terminological choice made by Li Shizhen for this last term.



Fig. 85. Magnolia (*xin yi* 荳蔻), in *Ben cao gang mu* (1640, *mu bu xiang mu tu* 木部香木圖, *juan zhong* 卷中, 51b).

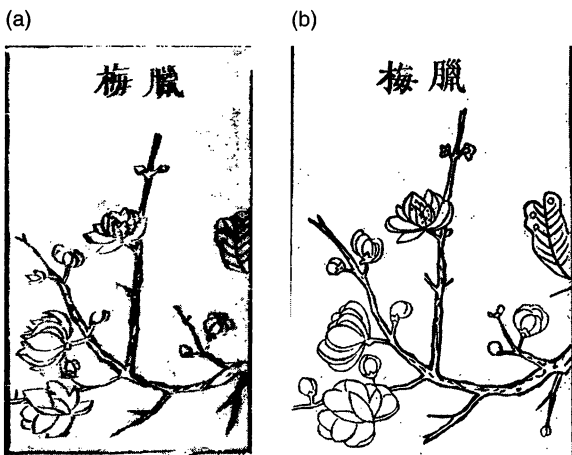


Fig. 86. Wintersweet (*la mei* 臘梅, *Chimonanthus praecox* (L.) Link.), in *Hua jing*: (a) in a Chinese edition, dated 1688 but definitely later (*tu* 圖, 1b); (b) in the *Hiraga Gennai* Japanese edition (1773, *juan* 3, 1b).



Fig. 87. Wintersweet (*la mei* 臘梅), in *Ben cao gang mu* (1640, *mu bu guan mu tu* 木部灌木圖, *juan xia* 卷下, 11a).

hardly at all fragrant and of the worst quality. The fruit is like an upturned bell. It ripens in summer . . .

Now let us continue by reading the *Ben cao gang mu*:

Explanation of the name: this plant, basically, is not of the *mei* category. Its name comes from the fact that it grows at the same time as the *mei*, its perfume is similar and its colour resembles that of wax (*feng la*). **Grouped explanations:** the *la mei* is a small tree with bushy branches and pointed leaves. There are, in all, three varieties: that which is grown from seed and not from grafting or cuttings in the twelfth month produces small flowers with hardly any fragrance and is called 'Japanese apricot tree–dog fly' (*gou ying mei* 狗蠅梅³⁰⁴). The one that is grafted or from a cutting, the flowers of which, spaced out and fully blooming, seem only half-open, is called 'Japanese apricot tree – bronze bowl' (*qing kou mei* 磬口梅). The one that has dense and strongly perfumed flowers of a deep yellow, resembling the flowers of red sanders (*zi tan* 紫檀³⁰⁵) is called *tan hsiang mei* 檀香梅, 'Japanese apricot tree–sanders perfume', and is the most highly prized one. The fruits resemble upturned bells, they are pointed and more than one inch long, the seeds are inside. If one steeps the cortex in the water in which one crushes ink, [the ink] becomes shiny.³⁰⁶

Although he does not cite him at all, Chen Haozi seems to have learned a great deal from Li Shizhen, especially given that Li Shizhen mentions that he is introducing *la mei* into *materia medica* for the first time and that he refers only to himself in the texts that he cites. At this point, based on the information we have given, an assessment of his skill at compilation would not be favourable to the author of the *Hua jing*. However, if, prompted by curiosity, one considers the text of the 'Treatise on the

³⁰⁴ *Gou ying*, dog louse-fly, is cited by Li Shizhen in *juan* 40, in the section on bugs, *chong*, in the 'oviparous' category. Identified as *Hippobasca capensis* Olf. in Read (1941, Fig. 43).

³⁰⁵ *Pterocarpus santalinus* Wild.; Jia Zuzhang and Jia Zushan (1955, Fig. 1036).

³⁰⁶ Li Shizhen (1975–81, Volume 3, p. 2132).

Japanese Apricot Tree', *Mei pu* 梅譜, by Fan Chengda 范成大, completed in 1186, one has to revise that judgement:

La mei, basically, does not belong to the category of the *mei*; it is called *la mei* because it [grows] at the same time as the *mei*, its perfume is similar and its colour is very like that of honeycombs (*mi pi* 蜜脾). In all, there are three varieties: that which, emerging from seeds and not from grafting or cuttings, with small flowers with hardly any perfume, is the most mediocre and is popularly called 'Japanese apricot tree-dog-fly' (*gou ying mei*). The one that is from a grafting or a cutting, the flowers of which are spaced out and, although in full bloom, are often only half-open, is called *qing kou mei*, so called for its resemblance to the opening (*kou*) of a monk's bowl (*qing*); this is the earliest one. The one that is a deep yellow, resembling the red sanders (*zi tan*), with dense and very fragrant flowers, is called 'Japanese apricot tree-perfume of sanders' (*tan xiang mei*); this is the most highly prized one. The smell of wintersweet is extremely fragrant, more so than that of the Japanese apricot tree, but, because at first its appearance it is not brilliant, it is hard to write in praise of it, although deep ravines and the humble studios of literati have inspired a profusion of little quatrains. This plant often keeps its leaves; its fruits resemble upside-down little bells, pointed and more than one inch long; and they also resemble winter peaches;³⁰⁷ the seeds are inside.

As can be seen, Li Shizhen does not introduce much extra information, but, almost word for word, repeats the text of the *Mei pu*. We may wonder about the reasons that led him not to indicate his source here, when he expressly cites Fan Chengda when he writes of the Japanese apricot tree in *juan* 29. Perhaps he just forgot to. Now let us return to the problem of the resemblance of the two illustrations. Although I think that the new edition of the *Ben cao gang mu* certainly served as a model for Chen Haozi, I also wonder whether the source for the engravings that figure in this edition and that are modified compared to their appearance in the Jing-ling edition may be found in the work of some contemporary artist. The fact is that the quality of the brushstrokes, as well as the elegance of the composition – particularly in comparison to earlier engravings – certainly reveals the hand of a professional.

This question, which must remain in the air, now prompts me again to return to another genre of illustrated works concerning plants, namely treatises on painting.³⁰⁸ What is remarkable is that many of them present a catalogue of the various parts of a plant only to arrive at a representation of the plant in a composition that associates it with another plant or some rock. So this is a model that serves as a basis for learning how to paint, the ultimate aim being not so much to capture a formal resemblance but rather to manage to touch the sensitivity of the spectator by an apposite evocation.³⁰⁹ At first, only a limited number of plants that

³⁰⁷ *Tao nu* 桃奴. These were peaches that did not fall from the tree when ripe but dried on the tree in the course of the winter. They were gathered in the first month of the year and used as *materia medica*. See *Ben cao gang mu*, *juan* 29 (Li Shizhen 1975–81, p. 1745).

³⁰⁸ A few extracts from the *Mei hua xi shen pu* have already provided a glimpse of one scholar's views about a flower. See Fig. 30 above.

³⁰⁹ The preface to the *Song zhai mei pu* 松齋梅譜 (1351, by Wu Daisu 吳大素) records, 'In scholar-officials' playing with brush and ink, excellence consists of meanings (*yi* 意 – 'ideas') being there, not in the attempt to capture formal likeness.' Bush 1971, p. 142.

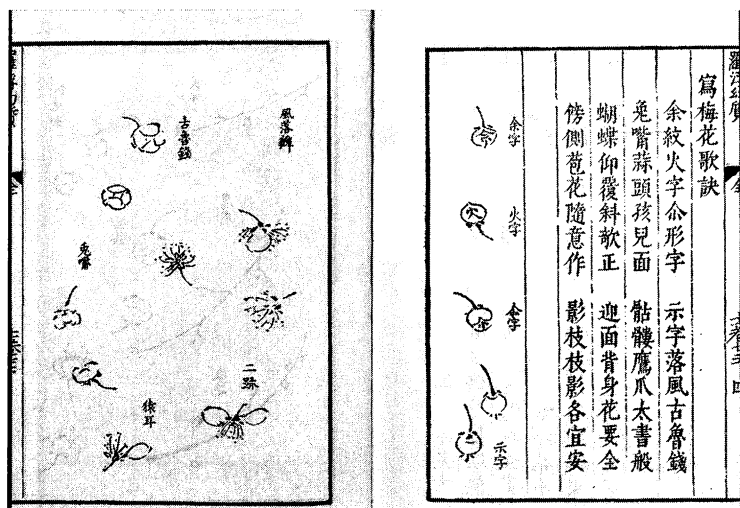


Fig. 88. Japanese apricot (*mei hua* 梅花), in the treatise on painting *Luo fu huan zhi* (1598, *juan* 11, *xie mei hua ge jue* 十一卷, 寫梅花歌訣, first two pages).

were particularly rich in symbolism were included in these manuals. For instance, in the *Yi men guang du* 夷門廣牘 (1598), compiled by Zhou Lüjing 周履靖, only 'orchids' (*lan* 蘭),³¹⁰ bamboos (*zhu* 竹)³¹¹ and 'flowers of the Japanese apricot tree' [*mei* 梅]³¹² are presented, in all their states, to the reader (Figs. 88, 89, 90). Another treatise, published in 1679 by the son-in-law of Li Yu 李漁, Shen Xinyu, entitled *Jie zi yuan hua pu* 芥子園畫譜 (Mustard Seed Garden Manual of Painting), is designed to assist landscape painting. Starting with a study of the procedures used by famous artists in their paintings, a painter, Wang Gai 王概 (*zi*: Anjie 安節), draws up an inventory of the various elements that were to be found in these compositions, starting with plants. After a few pages of theoretical and practical reflections, the book consistently presents images and texts together, each illuminating the other.

³¹⁰ This generally means *Cymbidium*. The text by Zhou Lüjing, revised by Xiang Yuanbian 項元汴, which is devoted to them, is entitled *Jiu wan yi rong* 九畹遺容.

³¹¹ The text in two *juan* devoted to bamboos is entitled *Qi yuan xiao ying* 淇園肖影 and it begins with a 'Method for Drawing Bamboos' (*Xie zhu fa* 寫竹法) by Li Xizhai 李息齋.

³¹² This term is polysemic. It specifically designates one of the Rosaceae, the Japanese apricot tree (*Prunus mume* Sieb. et Zucc.), but it also possesses a folk generic meaning that may be translated as 'plant resembling the Japanese apricot tree'. This group of trees includes the *la mei* 蠟梅 (the 'wax *mei*', *Chimonanthus praecox* (L.) Link). The Chinese importance of this folk classification is such that one eminent botanist (Li Hui-Lin 1985), when writing about *Prunus mume*, the Japanese apricot tree, one of the Rosaceae, points out that the *la mei* should also be mentioned, even though it belongs to the family of the *Calycanthaceae*. The collection devoted to the *mei* is entitled *Luo fu huan zhi* 羅浮幻質 (Evocation of the Luofu Mountains). The drawings are preceded by three technical texts, *Xie mei fa* 寫梅法 (Method of Drawing Japanese Apricot Trees) by Yang Buzhi 楊補之, *Xie mei lun* 寫梅論 (Essay on Drawing Japanese Apricot Trees) by Tang Muya 湯沐雅, and *Xie mei jue* 寫梅訣 (Secrets for the Drawing of Japanese Apricot Trees) by Zhou Lüjing 周履靖. It should be noted that the literal meaning of the Chinese term *xie* 寫, which I have translated as 'to draw' or 'drawing', is 'to write with a brush', and it is true that drawing flowers using a paintbrush and nothing but ink is indeed primarily an exercise in calligraphy, particularly where bamboos (*lan*) and orchids (*mei*) are concerned.

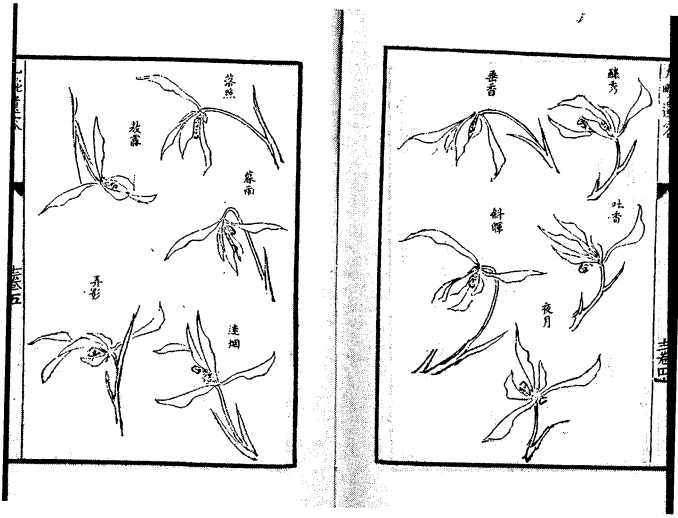


Fig. 89. Orchid flowers (*lan hua* 蘭花, *Cymbidium* sp.), in the treatise on painting *Jiu wan yi rong* (1598, *juan* 12, 4b–5a).

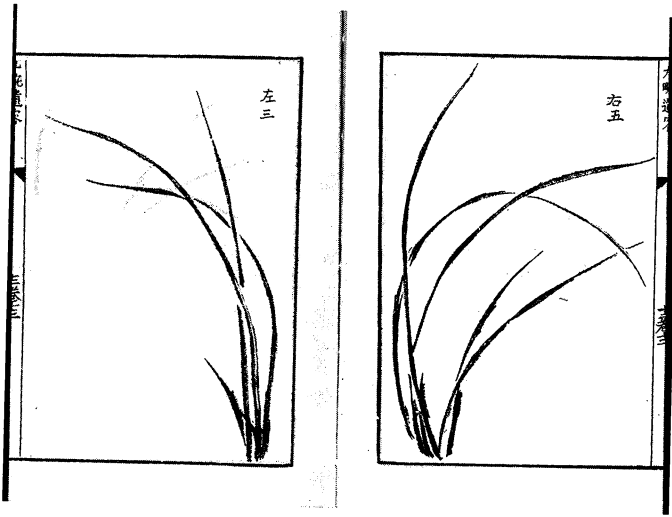


Fig. 90. Orchid leaves (*lan hua* 蘭花, *Cymbidium* sp.), in the treatise on painting *Jiu wan yi rong* (1598, *juan* 12, 12b–13a).

Painters thus acquired their knowledge of plants not by direct observation but by analysing the skills of great precursors (Figs. 91, 92). The approach of Zou Yigui 鄒一桂 (1696–1772),³¹³ a famous painter of flowers, seems to be more introspective

³¹³ The first part of this work is devoted to the technique for painting flowers, in which the essential morphological characteristics are indicated in short monographs that form a series of separate paragraphs. These monographs are preceded by a theoretical introduction consisting of an explanation of the ‘eight

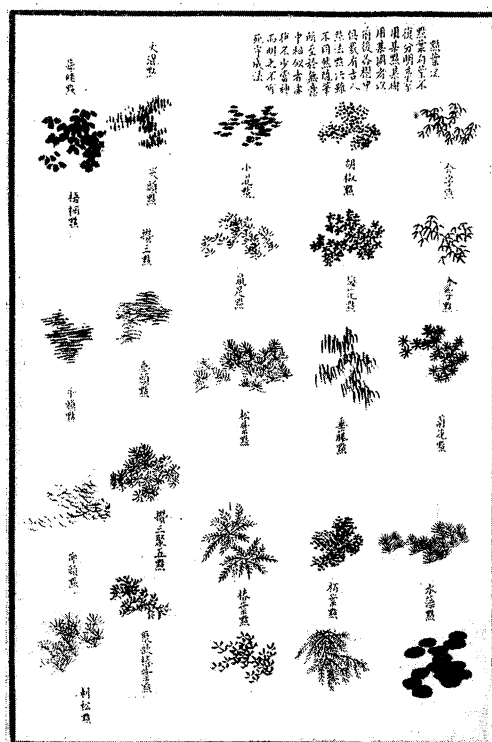


Fig. 91. Models of foliage from various trees, in the treatise on painting *Jie zi yuan hua pu* (1679, modern undated edition, Volume 1, *juan* 2, 7b).

but also more naturalistic. He ends his introduction to his *Xiao shan hua pu* 小山畫譜 (Treatise on Painting of Xiao Shan) (1740), with a reminder of the 'need to investigate things so as to attain knowledge if one wishes thoroughly to examine the profound reason for things and understand the ways of change'.³¹⁴ In other words, his perception of plants, to which he devotes the greater part of his text, is intended to be profound and detailed. In each of the paragraphs in the second part of the first *juan*, under the title *Ge hua fen bie* 各花分別 (That Which Distinguishes Each Flower), Zou Yigui adopts a systematic presentation that for each plant cited takes into account the characteristics that he considers to be important: the colour (of the flower), the respective disposition of branches and of leaves on stems in relation to the nodes, the period of flowering, details concerning the flower (number of petals,

techniques for drawing lines and the four things that one needs to know', *ba fa si zhi* 八法四知. A number of extracts translated into French may be found in François Cheng (1989).

³¹⁴ *Yu qiong shen er da hua bi ge wu yi zhi zhi* 欲窮神而達化必格物以致知 (Zou 1740, p. 7b). The first part of the statement refers to a passage of commentaries on the *Yi jing*, in the Appendices *Xi ci* (see Sung (1935, p. 317)), the second refers to the passage from the *Da xue* cited above. See p. 5 above.



Fig. 92. Models of leaves and flowers of chrysanthemums, in the treatise on painting *Jie zi yuan hua pu* (1679, modern undated edition, Volume 2, *juan* 7, 2b).

structure of the corolla, floral elements: *rui* 蕊, *xu* 鬚, *xin* 心), the presence of thorns, the setting of fruit and other striking particularities. Take the example of *mei*:

White flower, five petals, alternate branches and leaves.³¹⁵ Flowers between winter and spring, for first it receives the material force of the *yang* (*yang qi* 陽氣). Round *rui* [anthers], small *ti* [calyx], dense *xu* [filaments of stamens] and in the middle a heart with no little dots (*zhong chou yi xin wu dian* 中抽一心無點) [the pistil]. When the flowers have withered, what produces fruit are all the flowers that possess this. People have not observed this attentively. Close to the *geng* 梗 [peduncle] there are minuscule *bao* 苞 [sepals]: when the plant is fully out, these are flat in shape; at the moment of flowering, there are tiny buds. The young branches are dark green (*qing*), the old trunks are twisted into the shape of dragons, black with a little brown. Among those with double flowers, there are 'jade butterflies' (*yu die* 玉蝶), 'red apricot trees' (*hong mei* 紅梅), and 'green calyx' (*lü e* 綠萼), all of which are distinct varieties.³¹⁶

The author's interest goes beyond the simple didactic aim of helping flower painters. Although he does mention the colours of various parts of the plants that he describes and sometimes even explains in detail how to paint them, as in the case

³¹⁵ Literally, 'irregular in relation to the knots', *ye zhi po jie*.

³¹⁶ *Xiao shan hua pu* (Zou Yigui 1740, p. 7b).

of peony shrubs, he also frequently offers information on the geographical or historical origin of a plant,³¹⁷ the etymology of its name and even the possible uses of its various parts. Clearly, he adopts a global approach to the plant in all its cultural dimensions, including, of course, its botanical aspect.³¹⁸ Starting out with aesthetic concerns, Zou Yigui composed a little manual on morphology that any botanist would be proud of having produced. The acuity of his observation is clear in the text cited above, for it indicates the importance of the pistil in fertilisation, at a time when nothing precise was known about this process in China. However, to appreciate his achievement fully, we should not forget his view of Western paintings, based on the paintings of Castiglione that he had been able to observe at the Court of Emperor Qian Long:

The Westerners are skilled in geometry and consequently there is not the slightest mistake in their way of rendering light and shade (*yin yang* 陰陽) and distance (near and far). In their paintings, all the figures, buildings and trees cast shadows, and their brush and colours are entirely different from those of Chinese painters. Their views (scenery) stretch out from broad (in the foreground) to narrow (in the background) and are defined (mathematically measured). When they paint houses on a wall, people are tempted to walk into them. Students of painting may well take over one or two points from them to make their own paintings more attractive to the eye. But these painters have no brush-manner whatsoever; although they possess skill, they are simply artisans (*jiang* 匠) and can consequently not be classified as painters [i.e. artists].³¹⁹

What was missing from the representations of the Westerners that made it impossible to consider their authors as artists? No doubt their inability to capture what, for Chinese painters, was fundamental, the essence of things, as is pointed out by the following quotation from a specialist of ink representations of the flowers of Japanese apricot trees, Chen Yuyi 陳與義 (1090–1138): ‘If the idea is adequate, why pursue colour and likeness?’³²⁰

In this respect, the choice not to seek precision appears in clear opposition to what is shown by plant iconography produced for the Lyncei Academy under the aegis of Prince Cesi, in Rome, at the beginning of the 17th century.³²¹ Could it be that the reason for such a difference in precision in the images to be found in Chinese and European works in the 16th and 17th centuries is that in the West the artists who represented plants turned them into ‘portraits’, whereas in China artists sought instead to seize upon the general idea of them?

³¹⁷ For instance, Zou Yigui (1740, p. 16b) declares that the rhododendron (*Rhododendron simsii* Planch.) was originally limited to present-day Sichuan and was called *hong zhi zhu* 紅躑躅. That was no longer the case in his day as it was to be found everywhere and was then called *du juan* 杜鵑, after the name of the cuckoo that sang at the time of its flowering.

³¹⁸ From this point of view, he differs profoundly from the attitude of anyone such as Li Yu (1611–?1680), who, in his *Xian qing ou ji* (Sparse Notes of an Enquiring Mind) devotes several chapters to plants – or, more exactly, to his relations with them. Nevertheless certain passages are not unconnected to botany (See p. 602 above).

³¹⁹ Translation Sirén (1958, Volume 5, p. 228). My thanks go to Michèle Pirazzoli-t’Sertsevens for drawing this passage to my attention.

³²⁰ Cited in Bickford (1985, p. 58).

³²¹ See Freedberg (2002, Figs. 8.1–8.35, pp. 204–38).

(5) AN ORIGINAL EXAMPLE OF A TRADITIONAL BOTANIST, CHENG YAOTIAN

Cheng Yaotian 程瑤田 (zi: Yishou 易疇), for his part, was to approach plants from a quite different point of view. He was a native of She 歙 in Anhui. He was born in 1725 or 1726.³²² He obtained a degree in the Qian Long period (1736–96) and performed official functions. His biography informs us that he excelled in the study of the Classics.³²³ He seems to have been attached to the *Kao zheng xue* 考正學 movement, the ‘School of Verifications and Proofs’, which was characterised primarily by a critical approach to problems and a scientific orientation.³²⁴ He was certainly also adept in ‘practical studies’, *shi xue* 實學, as we shall see. He was interested in, among other things,³²⁵ the naming of plants and animals in canonical texts, and it is in this connection particularly that he attracted my attention. His contribution to natural history is to be found in three works: one is devoted to insects, *Shi chong xiao ji* 釋蟲小記 (Notice [on the Subject of] an Explanation about Insects), in one *juan*; the two others are devoted to plants, *Jiu gu kao* 九穀考 (Research into the Nine Grains) in four *juan* and *Shi cao xiao ji* 釋草小記 (Notice [on the Subject of] an Explanation about Grasses) in one *juan*. These, together with other writings, appear in a collection entitled *Tong yi lu* 通藝錄 (the author’s preface is dated 1804). Those three texts were also published, with a few omissions, in *juan* 552 of the *Huang qing jing jie* 皇清經解 collected by Ruan Yuan 阮元 (1764–1849) and printed in 1860.³²⁶ As the title suggests, the ‘Notice [on the subject of] an Explanation about Grasses’ concerns reflections on Chapter 13 of the *Er ya*, entitled *Shi cao* 釋草, which is devoted to herbaceous plants. The author tackles problems of how to understand certain terms in the original text and studies fourteen points in over eighty pages. The essay entitled ‘Researches into the Nine Grains’ devotes nearly 200 pages to analysing the meanings of the various terms that appear in the ancient texts for designating edible ‘grains’.³²⁷ In order to appreciate the work of Cheng Yaotian, let us now follow him in his analysis of the meaning of the term *tu* 荼, which even today continues to provoke arguments on account of its several

³²² In his preface to the *Tong yi lu*, dated to the eighth year of the Jia Qing period (1804), he states that he is in his seventieth year.

³²³ Fang Binguan et al. (1933, p. 1190).

³²⁴ Gernet (1990, pp. 447–50). On this movement, see the detailed study by Elman (1984).

³²⁵ There is a French translation of one of his essays on calligraphy and painting in François Cheng (1989, p. 35), and Elman (1984, pp. 182, 184) cites his research work on bronze bells of the Zhou dynasty.

³²⁶ Teng and Biggerstaff (1971).

³²⁷ The author touches on the study of the name of the principal ‘grains’ used as staple food, *liang* 梁, *shu* 黍, *ji* 稷, *dao* 稻, *mai* 麥, *da dou* 大豆, *xiao dou* 小豆, *ma* 麻, and *gu* 穀. On the subject of grains in Chinese antiquity see SCC Volume 6, Part II, pp. 423–517. See also Chang Te-Tzu (1983), and Qi Sihe (1949). In the latter article, the author recognises the pre-eminence of the work of Cheng Yaotian, who ‘not only collated countless texts, on which he based his research but, furthermore, went to make enquiries among old peasants in all the northern regions’. Qi Sihe passes in review all the important works that examine the ancient lexicographical texts that take into account nearly all of Cheng’s interpretations, and he concludes, ‘we have limited the above study to the most famous [of his interpretations]; as for the rest . . . that borrow from Cheng Yaotian, if one wished to cite them all it would not be possible’ (Qi Sihe (1949, pp. 263 and 264, n. 2). On the dating of Cheng Yaotian’s text, see Huang Shumei (1993).

meanings.³²⁸ The chapter is entitled *Shi tu, ku cai zhi tu* 釋荼苦菜之荼 (An Explanation of *Tu*, the *Tu* of Bitter Vegetables). What is the meaning of this laconic declaration? It implies that the author recognises that *tu* is a polysemic term and that he will begin by treating the case relating to ‘bitter vegetables’ – which are classified in the chapter on grasses in the *Er ya*. The author seems, furthermore, to assume implicitly that his readers are familiar with the passages of the *Shi jing* in which *tu* also appears in the context of bitter vegetables.

An Explanation of *Tu* (*Tu* of *ku cai*).³²⁹

There are two kinds of *ku cai* [bitter vegetable], one is *ku mai* 苦蕒, the Chinese prickly lettuce,³³⁰ the other is called by northerners *qu mai cai* 苣荬菜, corn sow thistle.³³¹ As for the Chinese prickly lettuce, I have seen the one that grows in the eighth and ninth months. First numerous leaves grow and spread out flat on the soil all around. Then, in the middle as many as twenty or more tender leaves gradually grow. All these leaves emerge from the root and do not come out of a stem. If you cut them, there is a white sap. Its taste is at first slightly sweet but then turns bitter. This bitterness sticks to one’s tongue and cannot be dislodged for a long time. According to what country folk say about the Chinese prickly lettuce that grows in the spring, in the fourth month a stem rises from the middle and makes a flower. As is said in the *Yue ling* 月令,³³² ‘the Chinese prickly lettuce flowers for *meng xia*’.³³³ The flower is yellow like [that of] the chrysanthemum. The bracts³³⁴ form an envelope³³⁵ that shelters the base of the flower-petals.³³⁶ Beneath each flower-petal is a seed,³³⁷ and since the flower has more than one hundred flower-petals, there are over one hundred seeds; at the tips of the seeds are white hairs like silk; over one hundred can be counted, each half an inch long. The bases of these flower-petals are surrounded by hairs, and contained in this bouquet; the flower-petals all close up after one or two days of flowering, then their colour changes. After several days, the flower-petals wither and fall. After a few more days the envelope dries and then opens. The white hairs at the tips of the seeds³³⁸ are then visible. Their

³²⁸ The term has been interpreted as the strict equivalent of *cha* 茶 (tea) (in Chen Chuan and Chen Zhengu (1978). Zhou Shubin’s challenge (1991; 1992; 1993) to this hypothesis (legitimate in my opinion) unleashed a virulent argument with Chen Chuan (1991; 1993). See also Fang Jian (1991).

³²⁹ In order to follow the translation of Cheng Yaotian’s text, I shall attempt to relate the technical vocabulary used by the author to that of modern botanical morphology.

³³⁰ *Ixeris denticulata* (Houtt.) Stebb.; anon. (1977b, p. 1296).

³³¹ *Sonchus arvensis* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0139).

³³² A monthly agricultural calendar. Here it refers to the fourth part of the *Li Ji* 禮記 (Memoirs on Correct Behaviour and Ceremonies); see Couvreur (1913, Volume 1, pp. 330–410). On this subject, see *SCC* Volume 6, Part II, pp. 52–5, and Dong Kaichen (1981).

³³³ *Meng xia* 孟夏, the first month of summer, corresponds to the fourth month of the traditional agricultural calendar, *nong li*.

³³⁴ The character 萼, used here, designates the external envelope of a flower or parts of that envelope; that is to say, generally, the calyx, but in some cases also the corolla or the sepals. In the case of the flower of a lettuce or a sow thistle, which is composed of a great number of tiny flowers (florets), juxtaposed on a support (receptacle), the kinds of leaf that surround the receptacle are called bracts and the envelope that they form is the involucre.

³³⁵ *Bao* 苞. The context indicates that this term designates both the involucre and the receptacle of the composite inflorescence.

³³⁶ *Hua ying* 花英. Cheng Yaotian regards the florets as petals, the ‘leaves’ of the flower, as he explains in the latter part of his demonstration.

³³⁷ This swelling at the base of the floret, which resembles a tiny seed, is in fact the ovary at the base of the stylus.

³³⁸ Here, this refers to the fertilised ovary and therefore to a real seed.

number is as great as tens of thousands; they are all identical, well ordered and disposed in a circle like a ball; this is what is called *tu* 荼, a tuft or pappus.

{Cheng Yaotian's commentary: In early spring the dandelion makes flowers. Flowers and leaves resemble [those of] the prickly lettuce and there are also pappuses (*tu*) at the base of the flower-petals which, after the envelope opens, likewise resemble a ball, but the white hairs that grow at the end of the seeds at first crowd together in a single stalk that is about three or four *fen* long [one *fen* is approximately 2.3 millimetres], then they spread out into a few dozen; their habit is loose and not close together; they do not resemble the pappuses (*tu*) of the prickly lettuce, whose countless white hairs all emerge at the top of the seed [forming as it were] dense and immaculate tufts}.

By this stage in his analysis, Cheng Yaotian has described what the *tu* of the first plant that he associates with the term *ku cai*, 'bitter vegetable', resembles: it is a matter of the collection of pappuses on the tips of the achenes that bear the receptacles of the lettuces. In the note just cited, he goes into more detail about the notion of *tu* by referring to the *tu* of dandelions, which, however, have a looser habit than those of the lettuces. Next, he tackles the case of the second plant in the category of 'bitter vegetables'.

As for the corn sow thistle (or hogweed) (*qu mai cai*), I have seen the one that grows in the seventh month. It has a trunk (*gan* 幹). Its leaves grow from each node, all the way up. After several leaves, the stem produces branches and all the branches regularly produce flowers like those that country folk call *ku mai hua* 苦蕒花.³³⁹ I have noticed that its receptacle is covered with white hairs and resembles a ball. So I realised that this is the reason why it is called *tu* [tuft]. In the eighth and ninth months the flower opens completely. But although the seeds (*zi*) are fully shaped, they produce no fruit.³⁴⁰ Country folk say that only the flowers of the fourth month produce fruit.³⁴¹ These fruits fall when the wind blows and thanks to the hairs that they carry, they fly away like the floss of willows,³⁴² fall to the ground and germinate.

{Cheng Yaotian's commentary: in the south, it is called 'the grass of hares',³⁴³ and it is said that hares [or other lagomorphs] eat this grass. From the second month until the end of autumn it flowers constantly. I wonder whether this might be the 'mallow of hares [lagomorphs]' which, in the third month, having reached its adult height, grows among the oats}.

³³⁹ 'Chinese lettuce flower': this may be a species of the *Ixeris* genus. ³⁴⁰ *Zi you xing er bu shi* 子有形而不實.

³⁴¹ The author uses both *zi* and *shi* to designate seeds, but he differentiates between the two terms: the former refers to the seed as an object, the latter to its reproductive function, hence my translation of *shi* as 'fruits' and 'to bear fruit' or 'to fructify'.

³⁴² This term *xu* 絮 was already employed by Li Shizhen, as we have seen (p. 181 above), to designate the woolly tuft that surrounds the seeds of willows.

³⁴³ This may designate *Lagerosieris sancta* (L.) K. Maly, 'lettuce of hares/lagomorphs' *tu ju* 兔莒 or 'vegetable of hares/lagomorphs' – *tu zi cai* 兔子菜. It is amusing to note that in Europe sow thistles are likewise associated with rabbits and hares in folk nomenclature: in France, *herbe à lapin* ('rabbit's grass') in the Auvergne and the Limousin, and *laitue de lièvre* ('hares' lettuce') in the Aisne, the Meuse and the Somme, designate *Sonchus arvensis* L., while *Sonchus oleraceus* L. is called *laitue de lièvre* in Anjou (Bouët et al. 1981) and 'hare's lettuce' (Grigson (1958) in Devon, Great Britain. I do not use 'rabbit' as a translation of *tu*, but rather 'lagomorph' or 'hare', since there were no rabbits (animals of Mediterranean origin) in China until they were introduced there as farmyard animals in the 19th century. However, there were hares, the names of which are constructed on the morpheme *tu*, even if the *Shuo wen jie zi* does indicate a special character to designate the hare (see Métaillé 1993b, p. 52).

In the chapter 'Ren di' 任地 of the *Lü shi chun qiu* 呂氏春秋, it is said,

at the end of the first month of summer the three weeds are eliminated and the barley is harvested; at the solstice, the bitter vegetables die and the star-thistle caltrops come out and now the millet is sown {Cheng Yaotian's commentary: I have shown in 'Research into the Nine Grains' that the character *ma* 麻 [hemp] in the text ought to be interpreted as *mei* 糜 [*Panicum* millet]} and also soya. This tells the people that the fertility of the soil is exhausted. So the summer solstice is the autumn for the bitter vegetables. The reason [for this] is that they flower (*xiu* 秀) for *meng xia*, bear fruit (*shi* 實) for *zhong xia* 仲夏³⁴⁴, then die. The reason why the autumn flowers produce no fruit (*shi*) is that they [come] from new shoots from seeds that have fallen to the ground. The tufts (*tu*) of the sow thistle (hogweed) (*qu mai*) and the lettuces (*ku mai*) belong to the same category; it is certainly the fourth month that is the true period of flowering (*xiu*).

So, for Cheng Yaotian, the fact that the tufts are of the same category (*er tu yi lei* 而荼一類) implies that the plants also have other characteristics in common, in particular the date of flowering, in the fourth month. This date is an indication that seems to him to be important for the rest of his investigation into other ancient texts:

In the domain of pharmacopoeia, the *Tong jun yao lu* 桐君藥錄 (Treatise on Medicinal Herbs by Master Tong)³⁴⁵ reports: 'in the third month, the bitter vegetables (*ku cai*) grow in abundance, in the sixth month the flower grows out of the leaves [on] a straight stem; the flower is yellow; in the eighth month the black fruits form; the fruits fall and [from] the root comes a new shoot; in winter they do not wither'. Kou Zongshi says:³⁴⁶ 'those that grow in the north wither in the winter, those that grow in the south in both summer and winter are always green {Cheng Yaotian's commentary: That is why they are also called 'they mock winter' (*you dong* 游冬)}. The leaves resemble those of the lettuce (*ku ju* 苦苣) but are narrower, pale green; when they are cut, a milky white juice seeps out, with a bitter taste; the flowers resemble those of the Indian chrysanthemum (*ye ju* 野菊),³⁴⁷ in the spring and in the summer and in autumn, they open constantly'. In the remarks of the two authors [one notices] very slight differences on the subject of the aspect of the plants. However, nobody manages to elucidate what is the true period of flowering (*xiu* 秀). I have sectioned the leaf, cut the root, and both have a white juice; the tip of the leaf is quite like the shape of a sword; the forked part close to the base is thick and hard; it is different from the leaf of the lettuce (*ku mai*), which is thin and soft. The line in the poem Gu Feng 谷風 in the chapter Bei Feng 北風 of the *Shi jing*, namely 'whoever says that the *tu* is bitter, it is as sweet as the shepherd's purse', and the definition of the *Er ya*: 'tu, bitter vegetable', both certainly refer to these two vegetables [*ku mai* and *qu mai cai*].

We can see from reading these two extracts that Cheng Yaotian moves constantly between the contents of ancient texts and contemporary folk knowledge: starting

³⁴⁴ The second month of the summer, the fifth in the agricultural calendar.

³⁴⁵ This work, now lost, appears in the bibliographies of the *Sui shu*. See anon. (1973). *Sui shu* 34, 1038. Its author is assumed to have been Huang Di, who established the three *san pin* ranks in which drugs were originally classified (see Ma Jixing et al. 1981, p. 203; Fang Binguan et al. 1933, p. 809).

³⁴⁶ The author of the *Ben cao yan yi* (1119).

³⁴⁷ *Chrysanthemum indicum* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0053).

from vernacular names that are more or less close to the ancient names, he tries to rediscover the plants that may be those mentioned in his written sources; he notes what the peasants say, compares it to his sources and also engages in minute observation of the plants, the results of which are recorded with the aid of an extremely detailed technical vocabulary. In doing this, he seems to be trying to define the relevant criterion or criteria that will make it possible to associate several plants within the same group or, to put that another way, to discover what these various bitter vegetables have in common. Apart from the presence of an acrid juice, he notes similar inflorescences and, after flowering, the presence of round tufts formed by the pappuses that surmount the many seeds. Cheng Yaotian is then in a position to declare,

It is by considering the flowering (*xū*) of the bitter vegetables (*kū cài*) that I have discovered the reason for the name *tū*: it is because of those balls of white hairs that seem [to form] a sphere at the tip of the seeds, which one sees after the flower-petals (*yīng*) have fallen.

This statement reminds us that his initial purpose was philological: to find ‘the reason for the name *tū*’. Readers may wonder about the importance that I ascribe to the work of a man such as Cheng Yaotian, who is hardly known as a botanist,³⁴⁸ in comparison to men such as Li Shizhen or Wu Qijun. There are two reasons for this. One is the intrinsic value of his method and the results that he announces. The other is that he describes the details of his method of work extremely precisely, thereby providing precious first-hand testimony. This aspect is reinforced when one looks at the drawings that are to be found in the texts, even if they relate to no more than a dozen plants. It seems quite clear to me that he copied them from nature. He records precisely the day when he makes his botanical expedition and the place where he goes ‘to pay a visit’ (*fāng* 訪) to a particular plant from which, he further notes, he takes a branch or a seedling, an image of which he transfers to paper. The very presentation of the plant that is drawn cannot but suggest to the eyes of a botanist a plate from a herbal handbook (Fig. 93). A particular feature of the illustrations is that they always refer to a text. Cheng Yaotian does not hesitate to record significant details of the parts of a plant, ‘in order to shed light’ (*yì míng*) on what he writes, as in the case of the spiralled pods of alfalfa³⁴⁹ (Fig. 94) that complete the preceding illustration of the plant as a whole. His method of procedure, which is influenced by the School of Verifications and Proofs, is highlighted by the caption, inserted alongside the drawing of the shoot of foxtail millet, which is there to justify the accuracy of the two citations taken from the *Huai nan zi zhu* 淮南子注 by Xu Shen 許慎 and from the work of Zhang Heng 張衡 (+78–139), showing the way the ‘ear’ leans toward the base of the plant. (Fig. 95). Without the caption, the image would simply refer to a passage in the principal text, as in the case of the rice paddy (Fig. 96).

³⁴⁸ The value of his philological work has long been recognised, as has been noted above (Qi Sihe (1949), see p. 327, n. 228), but he also deserves to be recognised as a remarkable observer of nature.

³⁴⁹ Probably *Medicago falcata* L., in anon. (1972–6, Volume 1, p. 374).



Fig. 93. Alfalfa (*mu xu* 苜蓿, *Medicago falcata* L.), in *Tong yi lu* (1804, *mu xu*, 4b).

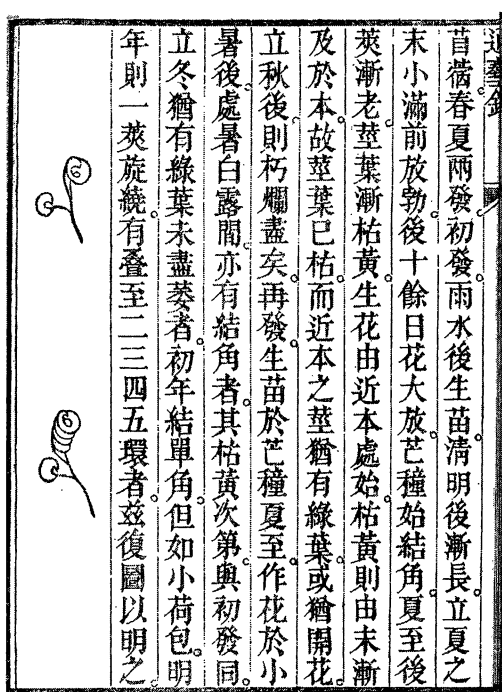


Fig. 94. Details of alfalfa pods in *Tong yi lu* (1804, *mu xu*, 5b).



Fig. 95. Foxtail millet, in *Tong yi lu* (1804, *tu si gu ji* 圖四谷記, 5a).

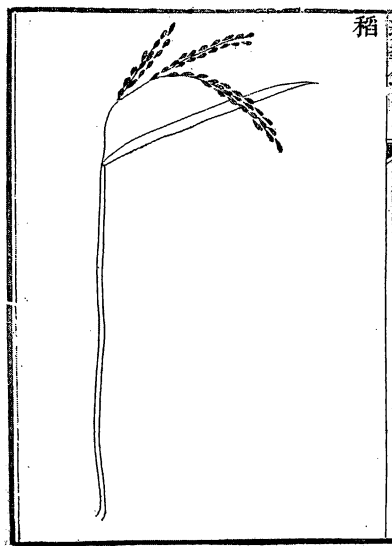


Fig. 96. Rice, in *Tong yi lu* (1804, *tu si gu ji* 圖四谷記, 4b).

In order to acquire a more complete understanding of his approach, I have chosen a second example that sheds light particularly on the fact that Cheng Yaotian was also a brilliant representative of *shi xue*, 'practical studies'. In a seven-page note, entitled *Shi mu su ji e jian tu cao mu xi* 蒔苜蓿紀譌兼圖草木樨 (Disentangling the True from the False When Planting Alfalfa and Also Drawing a Sweet

Clover), he tries to elucidate the meaning of the term *mu su* 目宿 (苜蓿), which is the name of the alfafa. He had already noted the incoherences in the descriptions of the colours of the flowers of the *mu su* by comparing what was written in the *Ben cao gang mu* (1596) by Li Shizhen and in the *Qun fang pu* (1620) by Wang Xiangjin. Furthermore, as his son was living in Beijing, he asked him to send him some *mu su* seeds. After sowing them, he realised that what was growing was a plant that he knew, which was locally known as *cao mu xi* 草木樨, a yellow sweet clover. He writes as follows:

The plant that Li Shizhen says has yellow flowers and that is drawn is this one. [Li] Shizhen, a man from the south, looked for seeds in the north and what he obtained to sow were the seeds of *mu xi*. Of course, for people of the north, *mu xi* and *mu su* are pronounced in the same way. Li Shizhen made a mistake ... Only the *Qun fang pu* says that the flowers are purple.

Then he sent another letter telling his son to ask for the seeds from someone who came from Shanxi, so as to avoid any mistake. In the autumn of 1796, he received new seeds that were very different from the earlier ones. He writes as follows:

The following year, I sowed them, in the second month. They germinated after *gu yu* 穀雨 [20 April]. I took the young shoots, blanched them and roasted them before eating them ... They tasted like a wild vegetable ... The leaves are trifoliated (*yi zhi san chu* 一枝三出), with a little tooth on the upper part ... I took a root, to examine it. It was single (*yi tiao du xing* 一條獨行). This year there were no flowers. I took a stem of *mu xi* [sweet clover] and one of *mu su* [alfafa] to compare them. The sweet clover is ramified like a tree, with a trunk and branches; but the other one develops hundreds of tangled stems resembling untidy hair. As it had not flowered, I again sowed it at the beginning of the autumn along with buckwheat, as is recommended in the *Qun fang pu*. The next year [1798] in the spring, shoots appeared from the persisting root of the alfafa (*su gen sheng miao* 蓿根生苗). On the twenty-first day of the fourth month, two days before *mang zhong* 芒種 [6 June], I saw that it had flowered. The flower with its heel was three *fen* long. The colour was slightly purple. Four petals. The largest faces in one direction, and, of the three smaller ones, two are opposite, with the third facing in [the same] direction [as the first]. The base of the small petals is enveloped in the base of the biggest one. The heel is contained in a small envelope with four divisions in the upper part. Inside the flower there is a heart formed by hard barbs that lean against the largest petal and carry at their tips yellow anthers. Such is the flower.

The lines above describe a flower of the Papillonaceae (Fabaceae). Cheng Yaotian continued, expressing serious criticisms of the work of Li Shizhen, and came to the conclusion that what he saw corresponded to what was written in the *Qun fang pu*. To avoid any future misunderstanding, he added two images that clearly illustrate the differences between the two plants (Figs. 93, 97). He emphasised the fact that it was to correct the errors of Li Shizhen that he had written all this and drawn the two images. This seems to me clearly to question the interest that he attached to the latter's work. The descriptions and the experiments – with respect both to taste and to cultivation – that he undertakes seem to me to be part of a scientific method strictly adapted to the particular case of plants: in this way, starting from a

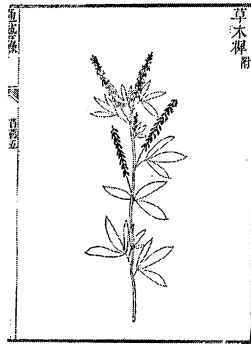


Fig. 97. Sweet clover (*cao mu xi* 草木樨), in *Tong yi lu* (1804, *mu xu*, 5a).

philological problem, he invents a botany that is no longer at the service of medicine or agriculture or drawing, but that leads to a minute and rigorous observation of plants in all their diversity, as much morphological and physiological as ethnobiological and historical. The particular attention that, in his explanation relating to *tu*, he devotes to the feathery nature of the inflorescences and fruits of certain plants leads him implicitly to define a group of plants that was not unknown to later botanists, as is shown by the engraving (Fig. 98) taken from a 19th-century German work of botanical popularisation. All these plants, from different botanical families, are said to be ‘anemochore’ (affected by the wind), for they share in common a mode of seed dispersal that depends on the action of the wind.

At the end of this survey of the way that Chinese literati described and represented plants from antiquity right down to the 19th century, a few observations are in order. In the first place there is an undeniable continuity in intellectual practices, as can be seen from the almost constant preoccupation with the same texts, mostly from the Han period. As for the iconography, what is also striking here is, with few exceptions, the strong tendency to reproduce ancient images rather than draw new ones from nature. The existing works reveal three key moments, in the 13th century with the *Lü chan yan ben cao* (+1220) by Wang Jie, in the fifteenth century with the *Jiu huang ben cao* by Zhu Xiao, published in +1406, and with the essays that Cheng Yoatian included in his *Tong yi lu* (+1804). The written sources indicate at least one other important milestone, the *Ben cao tu jing*, completed in 1061, which is the source of the illustrations that appear in other works of *materia medica*.

As for descriptions, the *Shuo wen jie zi* dictionary (+100) testifies to the existence of a technical vocabulary that was to be diffused through citations. In this domain, the *Ben cao tu jing* also played an important role by descriptive passages being systematically repeated in the *Zheng lei ben cao* and then the *Ben cao gang mu*, a text that served as a link to non-pharmacological literature, horticultural treatises in particular. It also played a crucial role in the diffusion of this terminology to other East Asian



Fig. 471.—Dispersion of fruits and seeds by the wind.

1 *Senecio vulgaris*. 2 *Adenium Honghel*. 3 *Valeriana tripteris*. 4 *Typha Schuttelworthii*. 5 *Briophorum angustifolium*.
6 *Cynanchum fuscatum*. 7 *Micromeria nervosa*. 8 and 9 *Taraxacum officinale*. 10 *Salix Myrsinites*.

Fig. 98. An illustration of what can be called 'family of plants with *tu* 荼', demonstrated by Cheng Yaotian in his *Tong yi lu* (1804). The illustration shows fructifications of so-called anemochoric plants, whose seeds and fruits are dispersed by the wind. After Anton Kerner von Marilaun (1896, Volume 6, Fig. 471, p. 857).

countries that used classical Chinese as a written language – Korea, Japan and Vietnam.

To provide a concrete illustration of this descriptive method, I shall now take the example of the way in which it has been possible to distinguish the various taxa collected under the generic term *tong* 桐.

synonym for *tong*. Elsewhere, a poem in the *Shi jing*³⁵³ – frequently cited in encyclopaedias – tells us that Duke Wen planted around a palace trees of four kinds, including *tong* trees, for the manufacture of citharas.³⁵⁴ This text associates the *tong* with three other groups of trees, their common characteristic being clearly stated to be the use to which they were put. Another passage in the *Shi jing* cites the *wu tong*.³⁵⁵

The *Shi jing* thus cites both *tong* and *wu tong*. The text of the *Er ya* and the commentaries of Guo Pu, on the one hand, and the text of the *Shuo wen*, on the other, provide the following information:

<i>Er ya</i>	<i>rong</i> :	<i>tong</i> tree	{ Guo Pu's comm.: today <i>wu tong</i> }
	<i>chen</i> :	<i>wu</i>	{ Guo Pu's comm.: today <i>wu tong</i> }
<i>Shuo wen</i>	<i>tong</i> :	<i>rong</i>	
	<i>wu</i> :	<i>wu</i> tree, syn. <i>chen</i> .	

According to the commentary on the *Er ya* it is possible to deduce that the terms *rong*, *chen*, *tong* and *wu tong* are synonymous, whereas such a conclusion cannot be drawn from a reading of the *Shuo wen*, for *tong* (= *rong*) and *wu* (= *chen*) designate two different plants.

The text of the *Shi jing*, just cited, associates the *tong* with other carpenters' woods and provides information on the ecology of the *wu tong*. The first explicit classification of the *tong* is to be found in the *Shen nong ben cao jing*, which contains an entry for the *tong* leaf, *tong ye*, which is classified in the category of products of inferior rank, *xia pin*.

These early references already indicate the complexity of the problem of the identification of plants designated by archaic terms and remind us of the existence of a whole specialised literature that studies the names of plants and animals cited in ancient texts.³⁵⁶ Tao Hongjing's remark about the difficulty of identifying the *tong*, in connection with the leaf of the *tong* in the *Shen nong ben cao jing*, clearly indicates the generic character of the term.³⁵⁷ This was later to be explicitly stated in the *Tong pu*

and *wu*. The *Shuo wen*, furthermore, explains *wu* as follows: '*tong* tree also named *chen*' – *tong mu yi ming cheng* 桐木異名櫟.

³⁵³ *Ding zhi fang zhong* 定之方中 in the Yong Feng 鄺馮. See Xiang Xi (1986, p. 713).

³⁵⁴ *Shu zhi zhen li, yi tong zi qi yuan fa qin se* 樹之榛栗椅桐梓漆爰伐琴瑟. Couvreur (1896, p. 57) translates this passage as follows: 'There he planted hazel trees and chestnut trees ... he also planted three species of catalpas and sumacs so that their wood could be used to make lutes'. Clearly, here the translator considers the *tong* to be a species of *Catalpa*, as is *zi* (*Catalpa ovata* G. Don; Jia Zuzhang and Jia Zushan (1955, Fig. 0260)) and *yi* (*Idesia polycarpa* Maxim; Jia Zuzhang and Jia Zushan (1955, Fig. 0672)). A modern Chinese synonym of the latter term is *shan tong zi* 山桐子, 'mountain *tong*'. It should be noted that nowadays musicologists replace the ambiguous term 'lute' by 'table cithar'.

³⁵⁵ *Wu tong sheng yi, yu pi chao yang* 梧桐生矣, 于彼朝陽 – 'how well the Firmania grows on the sunny side'. Text in Da Ya, j. A: 9, see Xiang Xi (1986, p. 871) and also Couvreur (1896, p. 367).

³⁵⁶ See SCG Volume 6, Part 1, pp. 463–70. ³⁵⁷ Cited in *Ben cao yan yi*: see p. 350 above, n. 238.

by Chen Zhu,³⁵⁸ as also in the *Ben cao tu jing*, which is cited in the *Zheng lei ben cao*: ‘this category includes four kinds’.³⁵⁹

The *Zhi wu ming shi tu kao chang bian* mentions a citation from the commentary on the *Shi jing* by Lu Ji (+3rd century),³⁶⁰ in which the author tries to resolve the ambiguities in the nomenclature of the *tong*. Here is the essential passage in that text:

Bai tong 白桐 and *gang tong* 岡桐 are good for making citharas. *Bai tong* and *wu tong* are also both named *yi* 椅, although the primary meaning of *yi* is *wu tong*. *Gang tong* is what people of the south use to make oil. South of the Yangzi there is the *cheng tong* 頰桐 [red *tong*], which in the autumn produces red flowers but has no fruits. There is also a *zi tong* 紫桐 [purple *tong*], the flower of which resembles the lily³⁶¹ (*bai he* 百合) and the sweet fruit of which is eaten after being boiled. Finally ... there is a *ci tong* 刺桐 [thorny *tong*], the leaves of which resemble those of the *wu tong* and the dark red flowers of which open laterally like a hand. The trunk and the branches carry thorns.³⁶²

Lu Ji thus recognises the six following kinds of *tong*: *bai tong*, *gang tong*, *wu tong*, *cheng tong*, *zi tong* and *ci tong*, which I shall try to identify shortly.

The 11th century, with the publication of the monograph *Tong pu* 桐譜³⁶³ by Chen Zhu 陳翥 (1009–61),³⁶⁴ saw the appearance of the first systematic study of the *tong*. Its second chapter was, indeed, entitled *lei shu* 類屬, ‘classification’. Chen Zhu, who was born in Dongling 銅陵, in what is now Anhui, had as his *zi* Zixiang 紫翔 and as his *hao* Xian-ao-zi 咸鰲子. He was passionate about the cultivation of *tong* and bamboos and called himself ‘Prince of the *Tong* and Bamboos’.³⁶⁵ The *Tong pu* is mentioned in the bibliography of the history of the Song, classed among the agronomic works (*nong jia* 農家), and its author’s preface, dated 1049,³⁶⁶ declares,

I have planted *tong* trees to the south of Xi Shan and I have composed on the subject of the *tong* these ten chapters that form the ‘Treatise on the *Tong*’ in one single volume. There already exist writings on the cultivation of the *tong*, and I have relied on them in order to transmit this knowledge to posterity.³⁶⁷

The first chapter, *Xu yuan* 敘源 (Discovering the Origins), reproduces the most ancient citations concerning the *tong*; gives a generic description; and finally indicates the principal medicinal, mythical and technological properties of these trees.

³⁵⁸ *Tong zhi lei fei yi ye* 桐之類非一也, ‘[in] the *tong* category, there is not solely one [kind]’. This is the statement that begins the second chapter of the treatise. Pan Falian (1981, p. 17).

³⁵⁹ *Qi lei you si zhong* 其類有四種. ³⁶⁰ See SCC Volume 6, Part 1, pp. 464ff.

³⁶¹ *Lilium brownii* F. E. Brown var. *viridulum* Baker, in anon. (1972, Volume 5, p. 447) (= *Lilium brownii colchesteri* Wilson; Jia Zuzhang and Jia Zushan (1955, Fig. 1852)).

³⁶² Wu Qijun (1959, p. 1115). English version of author’s translation.

³⁶³ Wang Yuhu (1979, p. 98) notes the existence of another work by the same name written by Ding Wenbo (+1240), but long since lost.

³⁶⁴ Xiong Datong (1987, p. 229). ³⁶⁵ *Tong zhu jun* 桐竹君. See Wang Yuhu (1979).

³⁶⁶ According to Pan Falian (1987, p. 106), the work was probably composed between the winter of 1049–50 and the winter of 1050–1.

³⁶⁷ English version of author’s translation. Two versions of the text are used, that which is included in the *Zhi wu ming shi tu kao chang bian* and the recent edition with a commentary solely on the text in Pan Falian (1981).

Chapter 3, which is entitled *Zhong zhi* 種植 (Sowing, Planting), tackles their cultivation from the nursery stage right through to afforestation.

The fourth chapter, *Suo yi* 所宜 (What Is Suitable), starts with the nature of the *tong*, which are *yang* 陽 trees, and goes on to list the ecological and pedological conditions that favour them, while the fifth chapter, *Suo chu* 所出 (Places of Production), indicates, with the aid of citations, the zones that are famous for the quality of the trees that grow there. The following chapter gives a detailed description of felling techniques (*Cai zhuo* 采斫), and the eighth, *Qi yong* 器用, indicates the various possible uses of the wood, emphasising the importance of the period in which the trees are felled, for that determines the absence or presence of parasites in the wood. The ‘miscellanies’ (*za shuo* 雜說) of Chapter 8 consist of a series of citations of texts that record anecdotes about *tong* trees. The ‘notes’ (*ji zhi* 記誌) of the following chapters consist of two texts, *Xi Shan zhi tong ji* 西山植桐記 (Notes on the Planting of the *Tong* in Xi Shan) and *Xi Shan tong zhu zhi* 西山桐竹誌 (Memoir on the *Tong* and the Bamboos of Xi Shan), autobiographical accounts in which the author refers to the scepticism of those who see him taking an interest in such plantations, which, economically, are far less productive than those of mulberry trees.

The last chapter is a collection of poems by the author, some of which are known to us only thanks to their preface but all of which are about the *tong*. It is striking that the contents of these chapters are altogether comparable to those of the various rubrics of the *Quan fang bei zu*, which has been considered above.³⁶⁸

But now, after that rapid survey of the contents of this work, let us return to the second chapter,³⁶⁹ which addresses the classification of these trees. The first sentence is very clear: the term *tong* applies to a whole group of trees.

The *tong* generic is not unique.³⁷⁰ Here is what we know about it.

The first kind:³⁷¹ rough grain, loose texture. Rounded and thick leaf, lengthening to a pointed tip, shiny; covered in down and triangular when it is young. Emerging from seeds, it may grow in one year to the height of three to four feet. Emerging from roots, to three or four feet, when they are cut back, there are some [like] thick posts or that can reach one foot in circumference. At first, when it is small, in the period when the trunk is forming, the budding leaves at the heart of the tree are all downy and tender, the bark of the trunk is transparent and white; it likes to grow in places exposed to the sun. Its flowers open before the leaves; they are coloured white with a purple heart, the inside of which is sticky and red. The fruit comes in an ear, is shiny, long and wide, sometimes reaching three or four inches in circumference. Inside, there are two spaces and in those spaces is a fleshy part. The small

³⁶⁸ See above, p. 19. ³⁶⁹ Pan Falian (1981, pp. 15–24).

³⁷⁰ What is here translated as ‘generic’ is *lei*. As I understand it, this term has the ethnobiological sense of ‘folk-generic’ (see Berlin (1992), pp. 52–101; see also Atran (1987)). It seems to me that here it even has the meaning of a ‘generic species’, and that is perfectly justified by Chen Zhu’s remark. Depending on the context, *tong* designates one of the various taxa about to be described. On this notion of ‘generic species’, see Atran, Estin and Medin (1997), Berlin (1992, pp. 76–7).

³⁷¹ The term *zhong*, which in modern botanical terminology carries the meaning of ‘species’, is here translated as ‘kind’, so as to emphasise the fact that here it is a matter of ethnobiological taxa that are not necessarily botanical.

black and white spots that are to be found on the fleshy part are the seeds. It is called *tong* with white flowers.

Another kind: fine grain, the texture of the body is dense. A triangular and rounded leaf as large as that of the *tong* with white flowers; the colour is dark green, very downy and blue-green; the leaf is stiff with slightly purple veins; when the petiole [leaf stalk] is lifted up, the downiness is very visible. Grows mostly in places exposed to the sun. It develops well but does not grow as easily as the one with white flowers. Its flowers, too, open before the leaves; they are all purple and form ears resembling the flowers of wisteria. The fruit is thus in an ear, with the shape of a breast but slightly more pointed, like a myrobalan³⁷² but sticky . . . It too contains two spaces. The inside of the spaces is similar to that of the fruits of the *tong* with white flowers, but is slightly smaller, it is called the *tong* with purple flowers. The one with a flower that has a little more red and yellow colour is, in fact, very little different from the one with white flowers. These two *tong* have bark of the same colour, but while the flowers and leaves are hardly different, their texture is not the same, dense in the one case and loose in the other. From the eighth month onward they are again all in flower. When the leaves have ceased to fall, the flowers begin to open; at this point they are slightly yellow.³⁷³ Today, in the mountains, the valleys and the plains, there are above all many of those with white flowers while those with purple flowers are rare.³⁷⁴

Another kind: the branches, trunk, flower and leaf are comparable to those of the *tong* with white flowers. Slow-growing, small and with uneven habit. Fruit big and round. A fruit contains two to four seeds that one can use to extract oil. Nowadays the mountain people plant many of them, to the point where they form forests, in order to sell their seeds.³⁷⁵

Another kind: a fine grain, dense but with a texture that is inclined to split. The body has thick thorns. Its habit is like that of the dogwood,³⁷⁶ and its leaf is like that of the liquidambar [sweet gum].³⁷⁷ It grows mainly in mountain ravines. It is called thorny *tong*. The *Jin an hai wu yi ming zhi* 晉安海物異名志 (Monograph on the Different Names of Marine Things of Jin an) notes that 'the leaf of the thorny *tong* is vermilion, and its branches

³⁷² *Terminalia chebula* Retz. See anon. (1977b, Fig. 2388).

³⁷³ This passage certainly refers not to flowers but to the yellowish floral buds that develop after the leaves have fallen, survive the winter and then open up in the late spring. The period for the actual blooming of Paulownias in China is May. See Jia Zuzhang and Jia Zushan (1955, Fig. 0274).

³⁷⁴ These two descriptions immediately suggest trees belonging to the Paulownia botanical genus, *pao tong shu* 泡桐屬. China is the centre of the region throughout which this genus is dispersed; and of the seven Asiatic species now known, six are specifically Chinese, while the seventh is also to be found growing wild in Laos and Vietnam, according to Gong Tong (1976, p. 40). The classification of Paulownias still poses many problems and it is no doubt presumptuous to claim a certain identification for the two trees described in the text. Nevertheless, in the light of recent documents (Gong Tong (1976), anon. (1982b) and Hu Shiu-ying (1959)), I shall venture to do so, at the same time emphasising that the result remains hypothetical. See also another study on the use of paulownias (Hu Shiu-ying 1961). It may be considered that these two descriptions are of species or varieties. The first appears to correspond almost certainly to *Paulownia fortunei* (Seem.) Hemsl., *bai hua pao tong* 白花泡桐, remarkable for the speed of its growth, with leaves that start off downy but later become smooth. The second description is more problematic. The tree differs little from the first one: it is less big and grows more slowly. Considering, furthermore, the abundance of its flowers, the blooms of which bear comparison to those of the *Wisteria sinensis*, the form of the fruit and the fact that its leaves remain downy, I am inclined to choose *Paulownia tomentosa* (Thunb.) Stend, *mao pao tong* 毛泡桐, for this is an extremely polymorphous species. See anon. (1982b, p. 28).

³⁷⁵ Although no Chinese name for this plant is indicated, it is without question an *Aleurtia*.

³⁷⁶ *Dang*: given as a synonym of *zhu yu* in the Guang Ya, so it is a generic term.

³⁷⁷ *Feng*: *Liquidambar formosana* Hance; Jia Zuzhang and Jia Zushan (1955, Fig. 1182).

are thorny'.³⁷⁸ These two *tong*, although very abundant and although their wood can be worked, are not the kinds that carpenters prefer.

Another kind: the branches are not used; the body and leaves are altogether smooth as when the apple tree (*nai*³⁷⁹) begins to grow. These days, in the case of houses close together, they are planted in a line beneath raised flowerbeds, or outside walls and doors. Their name is *wu tong* 梧桐.³⁸⁰ It has seeds that can be eaten but it is not what is called *wu tong* in the *Shi jing*.

Another kind: a dark green body, rounded leaves, large and long. Height three to four feet. Flower very red and extremely lovely. The flowers form buds and are very dense, the leaves are very spaced out. Can be planted to good effect on stairways, in flowerbeds, in courtyards and pavilions, for their blossom to be admired in the summer and the autumn. One is called *zhen tong* 真/貞同 [true *tong*];³⁸¹ the purple one is called *cheng tong* 頰桐 [red *tong*]. Although these two species bear the name *tong* they are not used as wood to work with.³⁸² However, their colour is quite precious.

Thus, in 1049, Chen Zhu described six kinds of *tong*, of which only five were named, *bai hua tong* 白花桐, *zi hua tong* 紫花桐, *ci tong* 刺桐, *wu tong* 梧桐 and *zhen tong* 真桐; the last of these in fact combines two taxa, *zhen tong* and *cheng tong* 頰桐.

A little later, in 1058, the *Ben cao tu jing* recognised 'four kinds in this genus' (*qi lei you si zhong* 其類有四種): *qing tong* 青桐, *wu tong* 梧桐, *bai tong* 白桐 and *gang tong* 岡桐; in 1119, the *Ben cao yan yi* was still stating that there were four kinds of *tong*: *bai tong*, *ren tong* 茫桐, *wu tong* and *gang tong*.

If we bear in mind the fact that in +945, before Chen Zhu's treatise had been composed, the first Chinese-Japanese dictionary of the names of plants, *Honzō wamyō* 本草和名, cited four kinds under the entry 'tong leaf' (*tong ye*) – *qing tong*, *wu tong*, *gang tong* and *bai tong* – it would appear that 200 years later Chen Zhu's efforts at classification had still not been taken into account. Perhaps we should attribute this to the fact that he attached more importance to describing plants and giving them new names than to trying truly to clear up the confusion that existed in the ancient nomenclature. But possibly his treatise was not known to the authors of the *ben cao*, none of whom cite him until Li Shizen does.

The *Zheng lei ben cao*, in Chapter 14, classifies the *tong* in the section on trees of inferior rank (*mu bu xia pin* 木部下品) under the entry *tong ye* 桐葉 (*tong* leaf). Three citations from previous texts agree on the fact that there are four kinds (*zhong*) of

³⁷⁸ *Ci tong* 刺桐 is identified as the coral tree, *Erythrina variegata* L. var. *orientalis* (L.) Merr. (Li Hui-Lin 1979, p. 96), synonym of *Erythrina indica* Lam. (Jia Zuzhang and Jia Zushan 1955, Fig. 0984; Makino Tomitaro 1970, p. 323). Nevertheless, a comparison of its leaves to those of the liquidambar (sweet gum tree) leaves room for doubt and it may be this that has caused the authors of a recent Chinese flora to consider *ci tong* to be synonymous with *ci qiu*, thereby identifying it with *Kalopanax septemlobus* (Thunb.) Koidz. See anon. (1972–6, Volume 2, p. 1034). This interpretation is also accepted by Xiong Datong (1987).

³⁷⁹ *Malus prunifolia* Berkh var. *rinki* Rehder; Jia Zuzhang and Jia Zushan (1955, Fig. 1081).

³⁸⁰ The reference to edible seeds, combined with the name, causes me to identify it as *Firmiana simplex* Wight, unlike Zhang Qiceng (1982), who assimilates it to a paulownia.

³⁸¹ Both the graph 真 and the graph 貞 are to be found in the various versions of the text. In the first case the translation would be true *tong*, in the second virgin *tong*.

³⁸² This remark tends to prove that one of the explicit criteria for the naming of trees is the quality of their wood as a raw material.

tong.³⁸³ However, the names of these four kinds, which present certain variants, are given in citations with no attempts to elucidate possible cases of synonymy. Tao Hongjing, like the authors of the *Ben cao tu jing*, recognised the following trees: *qing tong*, *wu tong*, *bai tong* (the first being a synonym for *yi tong* 椅桐 and the other two being synonyms for *yi tong* and *huang tong* 黃桐) and *gang tong*, whereas the *Ben cao yan yi* did not cite *qing tong* but introduced as a fourth kind *ren tong*, from the seeds of which tung-oil (*tong you* 桐油) is extracted. In this same fourteenth chapter of the *Zheng lei ben cao*, other *tong* trees are mentioned but in separate rubrics: *ying tong* 榔桐 and *ying zi tong* 嬰子桐, both taken over from the *Ben cao shi yi* 本草拾遺.³⁸⁴ In the case of the first, the text states that it resembles the *wu tong* and grows in the mountains, while in the case of the second, it states that ‘the tree resembles the *qing tong*, its leaves are divided, it grows in mountain ravines, its bark is used for soaking silk’.

In Chapter 13, in the section on trees of intermediate rank, the products of other *tong* trees are also named: *hu tong lei* 胡桐淚, ‘*hu tong* tears’,³⁸⁵ and *hai tong pi* 海桐皮, ‘the bark of *hai tong*’.³⁸⁶ The authors of the *Zheng lei ben cao* indicate that they have moved the first rubric from the grasses section (*cao bu*) where it had been placed in the *Tang ben cao*, in order to classify it in the section for trees, and the second drug is introduced for the first time in this *ben cao*. The text of the *Ming yi bie lu* explains that it is because ‘the tree is tall and large and its bark and leaves seem to be the product of the poplar (*bai yang* 白楊), of the *qing tong* and of the mulberry that it is named *hu tong* [the Western *tong*]’. The text furthermore refers to Xi Yu (nowadays Xinjiang), the region where the *hu tong* grows in abundance.³⁸⁷

As for the *hai tong*, the *Ming yi bie lu* states that it grows in Nan Hai in mountain ravines of the south, that it has white bark and that it resembles the catalpa (*zi* 梓). Another citation, from the *Hai yao ben cao* 海藥本草 (c.+931) by Li Xun 李珣, explains the etymology:³⁸⁸ ‘according to the *Guang zhi*, it grows in the mountain ravines of Nan Hai and resembles the *tong* with a yellowish bark, hence its name’.

In this way the *Zheng lei ben cao* implicitly distinguishes between two types of *tong*, those that belong to the *tong* category (*lei*), *stricto sensu*, i.e. the four species that are cited in the *tong* entry, and those which, through a resemblance in morphology (and habitat?) have been baptised *tong*. Another common feature of these plants is that they are all classified in the *mu* section, for trees, in the book.

³⁸³ Tao Hongjing: *tong shu you si zhong* 桐樹有四種 – ‘there are four kinds of *tong* trees’. *Ben cao tu jing: qi lei you si zhong* 其類有四種 – ‘in its category, there are four kinds’. *Ben cao yan yi: jin ju si zhong tong* 今聚四種桐 – ‘today one takes four kinds of *tong*’.

³⁸⁴ See SCC Volume 6, Part 1, p. 275.

³⁸⁵ There are two identifications for the Chinese name of this tree: *Calophyllum inophyllum* L. (Jia Zuzhang and Jia Zushan 1955, Fig. 0699; Read 1936, Fig. 263) and *Populus diversifolia* Schrenk (anon. 1977, no 3223, p. 1544).

³⁸⁶ *Erythrina indica* Lam. (R/384), *Erythrina variegata* L. var. *orientalis* (L.) Merr. (anon. 1977, no 3994, p. 1941).

³⁸⁷ So *Populus diversifolia* would be a more likely identification for this tree, since *Calophyllum inophyllum* is definitely a semi-tropical or tropical plant.

³⁸⁸ Cf SCC Volume 6, Part 1, pp. 276–7. The citation is in Tang Shenwei (1959, p. 332).

In the *Quan fang bei zu*,³⁸⁹ *tong* appears both in the flower section, *hua bu* 花部, under the *tong hua* 桐花 entry, *tong* flower, to which texts relating to *ci tong* 刺桐 and *cheng tong* 賴桐 are annexed, and also in the tree section, *mu bu*, in which *tong* appears with *zi* 梓 annexed to it.³⁹⁰

In 1505, the *Ben cao pin hui jing yao* offered a more elaborate classification.³⁹¹ Still under the rubric *tong ye*, ‘*tong* leaf’ – thereby following the *Shen nong ben cao jing* – the *tong* is classified in the ‘section on trees of inferior rank’, *mu bu xia pin* 木部下品: it belongs to the ‘lignuous trees with upright stems’, *mu zhi mu*, *zhi sheng* 木之木植生, and its leaf looks ‘similar to the leaf of the catalpa but bigger’. The nomenclature is abundant: *bai tong*, *qing tong*, *gang tong*, *hua tong*, *rong tong*, *yi tong*, *tong mu*, *huang tong*, *wu tong*, *chen*, *you tong*. The botanical discussion (*miao*) that follows this list helps to resolve some of the problems of synonyms implied by the statement ‘there are three kinds of *tong*’.³⁹² Thus *bai tong* 白桐, *rong tong* 榮桐 and *hua tong* 花桐 correspond to the same tree which, in the second month, produces yellow-purple flowers and no fruit, while *wu tong* 梧桐 and *qing tong* 青桐 designate a tree with dark green bark and a particular fruit, the seeds of which are eaten roasted. The *Shi pin ji* 食品集 confirms this point.³⁹³ Finally, *gang tong* 岡桐 is a synonym for *you tong* 油桐. In this text there is still no reference to Chen Zhu’s treatise.

The other *tong* already taken into account in the *Zheng lei ben cao* are also cited. In Chapters 18 and 19, in the section on trees of middling rank, *hu tong lei* is classed as a ‘tree endowed with arbority’,³⁹⁴ like the *hai tong*, which enjoys the extra qualification *zhi sheng* 直生, ‘upright habit’. *Ying tong* and *ying zi tong* are included in Chapter 20 in the section on trees of lower rank, and the texts repeat the same citations from the *Ben cao shi yi* as are to be found in the *Zheng lei ben cao*. On the other hand, an analysis of the paragraphs, *zhi* 質,³⁹⁵ for each of the products cited shows clearly that the principal classificatory concern is for the nature or form of the drug and not necessarily for the plant that produces it. Thus the *Ben cao pin hui jing yao*, considered from the point of view of a classification of plants, appears essentially as a repetition and deeper appreciation of the choices made in the *Zheng lei ben cao*.

The situation is quite different in the *Ben cao gang mu*, in which Li Shizhen treats the group of *tong* trees in an original way, basing his remarks on earlier texts but analysing them in a critical fashion. Collecting together all these plants in the section for trees, he places the ‘tears of the *hu tong*’ in *juan* 34, ‘the category of fragrant trees’, *xiang mu lei* 香木類, while all the other *tong* are placed in the following chapter in the ‘category of large trees’, *qiao mu lei* 喬木類. He places *wu tong* under

³⁸⁹ See above, p. 20.

³⁹⁰ *Catalpa ovata* G. Don (= *C. kaempferi* Sieb.); Jia Zuzhang and Jia Zushan (1955, Fig. 0260).

³⁹¹ See the description above, pp. 67–74. See also *SCC* Volume 6, Part 1, pp. 302–8, Okanishi Tameto (1977, pp. 197–208), and Unschuld (1986) pp. 128–45.

³⁹² *Tong you san zhong*. ³⁹³ *Shi pin ji*, *Guo bu* 果部, *shang* 上 14b.

³⁹⁴ *Mu zhi mu*. On this idea of ‘arbority’, see *SCC* Volume 6, Part 1, p. 307.

³⁹⁵ Under this title there are mentions of indications concerning the aspect of some products as compared to others. For example, in the case of *tong ye*, we find *lei zi shu ye er da* 類梓樹葉而大 – ‘in the category of the Catalpa leaf but bigger’.

an entry of its own, clearly explaining what he is doing: ‘it used to be annexed under *tong*, but now I am making a separate entry [for it]’.³⁹⁶ Except for *hu tong lei* (tears of the *hu tong*), the titles for the entries are now the names of the trees, no longer the name of the part used; thus *tong* instead of *tong ye* (‘*tong* leaf’), *ying zi tong* instead of *ying zi tong zi* (‘seed of *ying zi tong*’) and *hai tong* instead of *hai tong pi* (‘bark of the *hai tong*’). After the rubrics devoted to two catalpas, *zi* 梓³⁹⁷ and *qiu* 楸,³⁹⁸ the following are taken into consideration in this order: *tong*, *wu tong*, *ying zi tong* (to which *ying tong* is annexed) and finally *hai tong*. In every case, Li Shizhen proceeds in the same way. First he cites extracts from his great pharmacological predecessors³⁹⁹ and then he provides a critical and personal comment. These remarks are interspersed with references to non-medicinal works, in the present case the agricultural classic *Qi min yao shu*, by Jia Sixie,⁴⁰⁰ and also the *Tong pu* by Chen Zhu, which has been discussed above. The matter of different synonyms of *tong* and etymologies is discussed under the title *shi ming* 釋名, ‘an explanation of names’. After tracing the origin of various terms, *bai tong* < Tao Hongjing, *huang tong* < *Tu jing ben cao*, *pao tong* < *Ben cao gang mu*, *yi tong* < Tao Hongjing, Li Shizhen adds,

Tong ye in the *Shen nong ben cao jing* designates *bai tong*. The flower of *tong* is tubular,⁴⁰¹ hence the name *tong*. The wood is light and hollow, white in colour, veined, hence the names ‘white *tong*’ and ‘bubbly *tong*’. Used to be called *yi tong*. The flowers precede the leaves, which is why the *Er ya* calls it *rong tong* [‘flowering *tong*’]. It is also said that there are some that flower but produce no fruit; I have not analysed this. Lu Ji⁴⁰² considers that *yi* designates *wu tong*; Guo Pu⁴⁰³ considers that *rong* designates *wu tong*, but that is wrong.

He then continues,

Tao [Hongjing] notes that there are four species of *tong*. Those that are seedless are *qing tong* and *gang tong*, those with seeds are *wu tong* and *bai tong*. Kou [Zongshi] says that *bai tong* and *gang tong* are both seedless. Su [Song] identifies *gang tong* with *you tong* while the *Qi min yao shu* by Jia Sixie says that that which produces fruit and has green bark is *wu tong*, that which flowers but has no fruit is *bai tong*. But in fact that which forms in winter on *bai tong* and resembles fruits really consists of groups of floral buds⁴⁰⁴ for the next year, not fruits. So to say that *gang tong* is *you tong* and that its fruits are fat and contain oil is to contradict [what] Mr Tao [says]. Today, analyses show that there are contradictions. There is no doubt that *bai tong* is *pao tong*: thick leaves, one foot in diameter, very rapid growth, bark of a whitish colour,

³⁹⁶ *Jiu fu tongxi jin bie chu tiao*. Li Shizhen (1975–81, p. 1999).

³⁹⁷ *Catalpa ovata* G. Don; Jia Zuzhang and Jia Zushan (1955, Fig. 0260).

³⁹⁸ *Catalpa bungei* C. A. Meyer; Jia Zuzhang and Jia Zushan (1955, Fig. 0259).

³⁹⁹ Generally these are Tao Hongjing (see *SCC* Volume 6, Part 1, pp. 244 ff.); Su Song (see *SCC* Volume 6, Part 1) and Kou Zongshi (see *SCC* Volume 6, Part 1, pp. 283–7). Li Shizhen refers respectively to the following works: *Shen nong ben cao jing ji zhu*, *Ben cao tu jing* and *Ben cao yan yi*.

⁴⁰⁰ See *SCC* Volume 6, Part II, pp. 55 ff.

⁴⁰¹ In Chinese *tong* 筒, which means ‘a section of bamboo’, is a homophone of *tong* 桐, apart from the tone.

⁴⁰² In the *Mao shi cao mu niao shou chong yu su*. See *SCC* Volume 6, Part 1, pp. 464 ff.

⁴⁰³ In his commentary on the *Er ya*.

⁴⁰⁴ *Hua fang* 花房. As will be remembered, *fang* 房 designates a fructification or an inflorescence composed of several elements, for example a bunch of bananas. In the precise case of paulownias, it refers to groups of flower buds.

wood that is light and hollow, without parasites, excellent for making objects or construction poles. In the second month it gives flowers resembling those of morning glory,⁴⁰⁵ but white. The fruits are like fat jujubes, more than one inch long; inside a shell there are blades bearing seeds, very light and resembling the seeds of elm trees or those of mallow that float where the wind takes them once the shell opens. The one with purple flowers is called *gang tong*. *Ren tong* is a synonym for *you tong*. *Qing tong* is the seedless form of *wu tong*. According to the *Tong pu* by Chen Zhu it is very easy to distinguish the *bai tong* from *gang tong*. He says: '*bai hua tong*: thick seed of loose texture, likes to live in places exposed to the sun. Emerging from seeds, in one year it may rise to three or four feet; large rounded leaf lengthening to a pointed tip, shiny and downy. Flowers precede the leaves. White flowers, heart of the flower slightly red. Fruit two to three inches long; inside there are two compartments, in the compartments a fleshy part, on this fleshy part a thin blade; the seeds are here. *Zi hua tong*: thin grain, dense texture, also lives in places exposed to the sun, but develops less easily than the *bai tong*. The leaves are rounded and triangular, as big as those of *bai tong*, of a dark green colour, very downy and not shiny, rigid and purplish. Flowers also precede the leaves, purple flowers. Fruit similar to that of the *bai tong* but longer, resembling the fruit of the mirobolan but sticky, with yellow flesh inside the compartments.' For both *tong* the colour of the bark is the same, but the flowers and leaves are slightly different and the texture of the wood is dense in the one case, but slack in the other. There are also some that have a second flowering in the winter ...⁴⁰⁶

Having, as we can see, separated *wu tong* from the rest of the *tong*, Li Shizhen confers upon it an autonomous status and indicates only one synonym, *chen 櫟*. The description that he gives for it is very precise:

Wu tong are everywhere. The tree resembles the *Paulownia (tong)* but the bark is dark green and not streaked. The wood has no nodes, and grows straight with a fine grain and dense texture. Leaf resembles the *Paulownias* but is slightly smaller, shiny and lobate.⁴⁰⁷ The anthers⁴⁰⁸ of the flower hang down like threads of mildew: the pod is about three inches long, formed by five strips joined together, which open as they age, and separate themselves, resembling sieves. They are called *tuo e 橐萼* [sepal-quiver].⁴⁰⁹ The seeds are tacked on to the *tuo e*; those that carry the most have four or five, those with fewer two or three. They are as big as pepper; their cortex is wrinkled.

The next plant to be presented is *ying zi tong 罌子桐*, '*tong* with fruit in [the shape of] a jar', so called because its fruit resembles a jar. A first synonym is *hu zi tong 虎子桐*, 'tiger *tong*', 'tiger, because toxic'. A second synonym, *ren tong 荝桐*, '*tong Perilla*', can be explained because the oil extracted from the seeds, the tung-oil, resembles that which is extracted from *Perilla* seeds.⁴¹⁰ The last synonym cited for this plant is the

⁴⁰⁵ *Qian niu hua 牽牛花: Pharbitis nil* Chois.

⁴⁰⁶ See above, p. 241–3, for a comparison of Li Shizhen's version and the original text. It is clear that for Li Shizhen, *zi hua tong* and *gang tong* are synonymous terms.

⁴⁰⁷ *You jian 有堅*. Literally, 'there are points'. ⁴⁰⁸ On the translation of *rui 蕊*, see p. 134 above.

⁴⁰⁹ We should note that Li Shizhen attributes two distinct names to the fruit (in the botanic sense) of the *firiana*. If it is closed, he considers it to be a pod, *jia 莢*, a term that he also uses for the fruits of leguminous plants and those of certain Brassicaceae. When the fruit is open and ripe, he calls it *tuo e 橐萼*. In modern botanical terminology, this type of fruit is named *gu tu 蓇葖*, follicle (see Fig. 99). See Wang Fuxiong and Hu Yuxi (1982, p. 74).

⁴¹⁰ The latter were sometimes used as food but were mainly employed as a coating for objects or else in the process of applying lacquer. According to Li Shizhen (1975–81, p. 920), this oil was extracted from the kind of plant

term that has today become the most current name, *you tong* 油桐, ‘*tong* with oil’. Li Shizhen describes this tree as follows:

Gang tong designates those of the *bai tong* that have purple flowers. *You tong*, in its branches, trunk and leaves, resembles *gang tong* but is smaller. The growth of the tree is slow, the flowers are slightly red but the fruits are fat and round. In each one there are two to four seeds, with white sweet flesh, but emetic, the size of the large seeds of the liquidambar. It is also called *zi hua tong* 紫花桐 [*tong* with purple flowers]. It is greatly cultivated for its seeds, which are commercialised for the oil that is used for lacquers and also by ship-repairers. In order to meet the demand for it, there is a lot of faking. The only authentic sort is that which, when one dips into it a hoop made from a bamboo slat and then pulls it out, forms something that looks like the covering of a drum.⁴¹¹

Annexed to this passage, Li Shizhen reproduces the citations from the *Ben cao shi yi* concerning *ying tong*, which he does not seem to have been able to identify as any plant known to him. The last tree taken into consideration in this series is *hai tong*, ‘sea *tong*’, a synonym for which is *ci tong*, ‘thorny *tong*’.⁴¹²

The problem of the botanical identification of the various *tong* trees now seems somewhat clarified. It seems to me that this group contains:

- *pao tong* 泡桐: *Paulownia fortunei* (Seem.) Hemsl.,⁴¹³ which has, as synonyms, *bai tong* 白桐, *bai hua tong* 白花桐, *huang tong* 黄桐, *yi tong* 椅桐, *rong tong* 榮桐 (Fig. 100).
- *gang tong* 岡桐: (?) *Paulownia tomentosa* (Thunb.) Stend.,⁴¹⁴ considered as a ‘variety’ of the preceding one, with purple flowers; it has as a synonym *zi hua tong* 紫花桐 (Fig. 101).
- *wu tong* 梧桐: *Firmiana simplex* Wight. ‘Chinese parasol tree’, which has as a synonym *chen* 櫟 and has a seedless variety, *qing tong* 青桐 (Fig. 102).
- *ying zi tong* 罌子桐: *Vernicia fordii* (Hemsl.) Airy-Shaw (= *Aleurites fordii* Hemsl.),⁴¹⁵ which has as synonyms *hu zi tong* 虎子桐, *ren tong* 荏桐, *you tong* 油桐 (Fig. 103).
- *hai tong* 海桐: *Erythrina indica* Lam.,⁴¹⁶ which has as a synonym *ci tong* 刺桐 (Fig. 104).
- *hu tong* 胡桐: *Populus diversifolia* Schrenk⁴¹⁷ (Fig. 105).
- *ying tong* 榔桐: not identified.

that Li Shizhen calls ‘white perilla’, *bai su* 白蘇 or *ren* 苳. In the past, it was distinguished from the other kind by the name *Perilla ocymoides* L., but nowadays it is associated with the ‘violet perilla’, as a single botanical species, *Perilla frutescens* Brit.

⁴¹¹ This is certainly a species of *Aleurites*, varieties of which are cultivated or used in China for the oleaginous properties of their seeds, which constitute the raw material for tung oil.

⁴¹² Already cited in the *Nan fang cao mu zhuang* and the *Tong pu*, from which Li Shizhen takes the information. Identified as *Erythrina variegata* L. var. *orientalis* (L.) Merr., in Li Hui-Lin (1979).

⁴¹³ Gong Tong (1976). The modern botanical term is *bai hua pao tong* 白花泡桐.

⁴¹⁴ Gong Tong (1976). The modern botanical term is *mao pao tong* 毛泡桐.

⁴¹⁵ See Fèvre, and Métaillé (2005, p. 554).

⁴¹⁶ According to Jia Zuzhang and Jia Zushan (1955, Fig. 0984), where the principal Chinese name given is *ci tong* 刺桐.

⁴¹⁷ Jia Zuzhang and Jia Zushan (1955, Fig. 0699) identify the term with *Calophyllum inophyllum* L., but I consider that identification to be mistaken, since the plant grows in southern China. I prefer to follow the excellent encyclopaedia *Zhong yao da zi dian* (anon. 1977b, Fig. 3223), which identifies the term with a poplar from the western regions of China.



Fig. 100. *Pao tong* 泡桐, *Paulownia fortunei* (Seem.) Hemsl., from anon. (1972-6, Volume 4, p. 12).

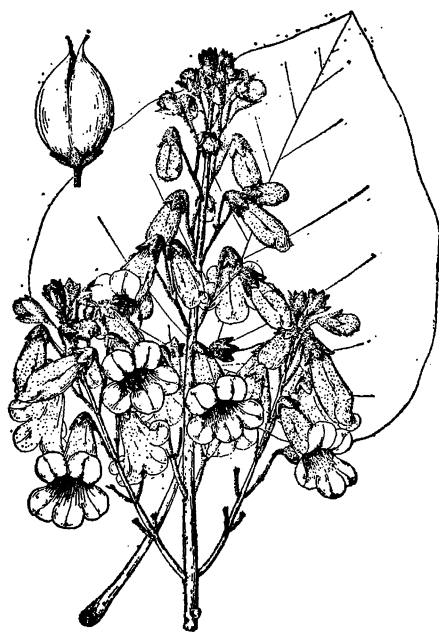


Fig. 101. *Gang tong* 岡桐 (?) *Paulownia tomentosa* (Thunb.) Stend., from anon. (1972-6, Volume 4, p. 12).



Fig. 102. *Wu tong* 梧桐, *Firmiana simplex* Wight., from anon. (1972-6, Volume 2, p. 823).

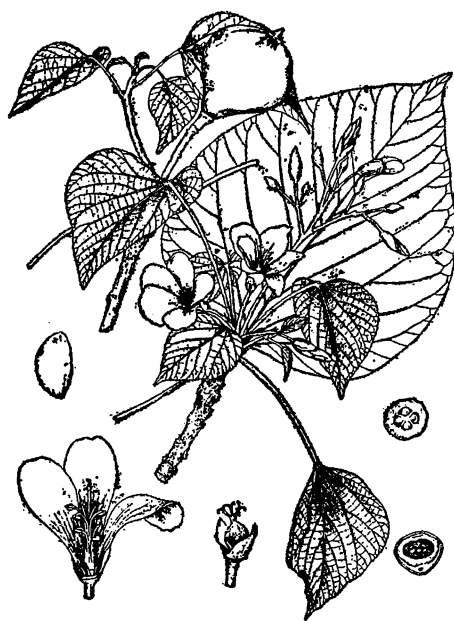


Fig. 103. *Ying zi tong* 嬰子桐, *Vernicia fordii* (Hemsl.) Airy-Shaw, from anon. (1972-6, Volume 2, p. 596).



Fig. 104. *Hai tong* 海桐, *Erythrina variegata* L. var. *orientalis* (L.) Merr. = *Erythrina indica* Lam., from anon. (1977b, n°3994).



Fig. 105. *Hu tong* 胡桐, *Populus diversifolia* Schrenk., from anon. (1972-6, Volume 1, p. 357).

In this way Li Shizhen, unlike the other authors of the texts presented earlier, explicitly poses the problem of the classification and identification of these various trees and tries to impose some order onto this rather confused group.⁴¹⁸ However, his solutions remain in the domain of a folk taxonomy: the criteria for collecting these various trees together seem to me to be, on the one hand, the presence of the morpheme *tong* as the basis of the name, and, on the other, morphological characteristics such as the size of the leaves and the quality of the wood. One might imagine that now that the situation was clarified in this manner, later authors would continue and refine this system. In fact, though, two examples show that even in works that make abundant use of citations from the *Ben cao gang mu*, this aspect of the knowledge of plants is rather neglected. Thus, for Chen Haozi, the author of the *Hua jing* (1688),⁴¹⁹ only the *wu tong*, the Chinese parasol, is retained in the chapter devoted to the group of trees with flowers.⁴²⁰ At the end of the paragraph about the *wu tong*, two synonyms of which are cited, *qing tong* and *chen*, the author simply indicates that there also exist *bai tong*, *hai tong*, *ci tong*, *cheng tong* and *zi tong*. That list suggests that, unlike Li Shizhen, he separates *hai tong* and *ci tong*. Chapter 73, the sixth of the fourteen that the authors of the *Guang qun fang pu* (1706) devote to trees, begins with *tong*. The numerous citations collated under this heading refer indifferently to trees of the genera *Paulownia* and *Firmiana*, apparently with not the least concern to clarify the problem of the different kinds of *tong*. Then, as a supplement,⁴²¹ there follow seven rubrics, in each of which there are citations of texts relating to *ci tong* 刺桐, *gang tong* 岡桐 (for which four synonyms are indicated: *you tong* 油桐, *ren tong* 荏桐, *ying zi tong* 罌子桐 and *hu zi tong* 虎子桐), *cheng tong* 賴桐 (synonym of *zhen tong* 真桐), *hai tong* 海桐, *hu tong* 胡桐, *hai wu* 海梧 and *zhe tong* 折桐.⁴²² It is clear that in this work no reflections on the nomenclature and classification accompany the extracts from the texts that figure beneath each of the plant names.

In Chapter 20 of the *Zhi wu ming shi tu kao chang bian*⁴²³ – the first of the three devoted to trees – *tong* figures as an entry; in the next chapter, so also do *hu tong lei* and *ying zi tong*, and finally, in the last chapter, *hai tong pi* and *wu tong* appear. Under the *tong* entry, the author, Wu Qijun, repeats all the classical citations already

⁴¹⁸ It is, however, noticeable that in the large trees section *qiao mu* (juan 35), the various *tong* are cited after *qi* 漆, the lacquer tree, and *zi* 梓, the catalpa. This is reminiscent of the association with the trees that Prince Wen caused to be planted in the park of his palace, as is mentioned in the poem in the *Shi jing* (Yong Feng, Poem 50, 'Ding zhi fang zhong', in Couvreur 1896, p. 57), to which I have referred above. This also indicates the importance of the model provided by the canonical texts, even for a mind as careful to analyse the grouping of plants on the basis of their morphological characteristics as Li Shizhen's appears to have been.

⁴¹⁹ See below, pp. 477–82. ⁴²⁰ *Hua mu lei kao* 花木類考. ⁴²¹ *Fu lu* 附錄.

⁴²² Here again, *hai tong* and *ci tong* are regarded as two different plants, whereas, contrary to Li Shizhen's decision, *gang tong* is said to be synonymous with *you tong*. *Hai wu* 海梧 (*Sterculia nobilis* Smith, according to Li Hui-Lin (1979)) was introduced together with *zhe tong* 折桐, which, according to the *Dong tian qing lu* 洞天清錄 by Zhao Xigu 趙希鵠 of the Song, was 'a *tong* with flowers; in the spring it flowers like *yu zan* 玉簪 [*Hosta sieboldiana* Engl.], but is slightly red'. This may have been a tree that grew in southern China, since the author was a native of Yuanzhou 袁州, present-day Yichun 宜春, in Jianxi. I have not managed to identify it precisely.

⁴²³ See p. 660.

quoted by Li Shizhen, adds the latter's opinion and reproduces the entire text of Chen Zhu's *Tong pu*. In making this choice, the *Zhi wu ming shi tu kao chang bian* seems to be adopting a position midway between those of the *Zheng lei ben cao* and the *Ben cao gang mu*: the *wu tong* certainly forms an autonomous entry, *tong* preserves its generic status and the other products of trees not implicitly classifiable under the generic *tong* continue to have a specific status. Through the abundance of references that are cited, the *Zhi wu ming shi tu kao chang bian* provides the reader with a mass of information that is superior to that of the *Ben cao gang mu*, but that attempts no synthesis with a view to a 'revision' of the taxonomic status of the various *tong* trees cited in the literature.

At the end of this chapter, it seems that the concern of some of the authors whose works have been studied has been to set in order a confused mass of information so as to make it possible to discover what was or what were the plant – or plants – hidden behind a name. One may well wonder, in the absence of any precise information on this matter in the various texts studied, whether there is any implicit reason for placing all these trees under the generic word *tong*. A first characteristic appears in Chen Zhu's work: the quality of wood suitable for carpentry. A second feature common to nearly all these trees is the possession of leaves of large dimensions. But this is simply speculation on my part. Chen Zhu, an 11th-century lover of forests, and Li Shizhen, a 16th-century naturalist doctor, were the two authors who pushed a classificatory concern the furthest, but neither proposed any taxonomic 'key'. It is striking that the efforts of the latter were emulated hardly at all and were in general simply ignored by posterity.

(h) KNOWLEDGE OF PLANT LIFE

When defining the framework for this part, Joseph Needham chose four main themes that related to a modern division of botany. That may seem an arbitrary way to treat this chapter. Nevertheless, even if none of these subjects was acknowledged as a specific kind of knowledge in China until the modern period, each one has at least been recognised. As we shall see, many texts are concerned with plant life, just as there have existed ideas, certainly erroneous in the light of modern physiology but nevertheless coherent, on the subject of the sex of plants; in Li Shizhen, the 'water grasses' were the object of a particular category of vegetables, as were mushrooms. In order to avoid all anachronism and ambiguity, here it will not be a question of plant 'physiology' or 'sexuality', nor of algology or mycology. However, I do propose to present knowledge about plant life, the sex of plants, aquatic plants and fungi as it can be apprehended by reading what the Chinese literati wrote, down through the ages.

(I) THE PERCEPTION OF PLANT LIFE

In the first section I shall present knowledge relating to plant life as the texts, in all their diversity, allow us to perceive it. I shall begin with considerations of a general order on the nature and development of plants since the period of the Warring States (–425 to –221). Next, the plants will be presented in their natural and human environment. Finally, I shall collect together the theoretical writings that take into account plants within the philosophical context of the observation of 'things', *wu* 物. In the absence of any botanical treatises, *stricto sensu*, in China before the end of the 19th century, it is in this way that I shall seek to grasp the way in which the nature of plant life was perceived, rather than as a botanist of today, who would include a chapter on the subject of 'plant physiology' in a treatise on modern botany. My aim is to show how plants have been perceived in the course of Chinese history, and how people have sought to understand and explain their existence and how they function.

(i) *Fundamental ideas*

In the *Xun zi* 荀子 by Xun Qing 荀卿 (c. –313 to –239), in Chapter 9, 'Institutions of the sovereign', *Wang zhi* 王制, there is an incidental mention of the place of plants in a scale of beings designed to justify the dominant position of man:¹

¹ Zhang Shitong (1974). On this important thinker, a representative of the Legalist movement, see *SCC* Volume 2.

Water and Earth possess a material force (*qi* 氣)² but not life (*wu sheng* 無生). Grasses and trees possess life (*you sheng* 有生) but not knowledge (*wu zhi* 無知). Birds and beasts possess knowledge (*you zhi* 有知) but not a sense of justice (*wu yi* 無義). Humans possess material force, life, knowledge and, furthermore, a sense of justice, so that is why they are what is the most precious under Heaven.³

This passage tells us about the fundamental qualities that plants were recognised to possess at the end of the Warring States period. They possess a material force, a *qi*; they also possess life (*sheng*) and thus are born, engender and die. One might add that this happens in accordance with immutable rules, as a passage from the *Guan zi* suggests:

That which roots the material force (*qi*) of Heaven and Earth, the balance between the cold and the heat, the proper water and earth, the life of humans, animals and plants, [that which] all things despite their diversity possess in equal measure and is immutable, is what is called the rule (*ze* 則).⁴

Derk Bodde cites this passage together with eight others to support an answer to the question 'Did "Laws of Nature" exist in China?',⁵ going back to a discussion with Joseph Needham, whose response to the question was negative,⁶ and who thought, in particular, at the end of his discussion on 'the words *Li* (Pattern) and *Ze* (Rules applicable to Parts of Wholes)',

One can now realise how mistaken would be the view that *ze* 則 meant anything like the laws of Nature in the Newtonian sense, and how dangerous it would be to assume that such an interpretation could properly explain the thought of the neo-Confucians about *Li* 理.⁷

Concerning the translation of the term at issue here, *ze*, W. Allyn Rickett considers that the content of the text is itself sufficiently clear for him to choose to translate *ze* as 'laws of nature'.⁸ Returning to his translation, Derk Bodde expresses a more nuanced judgement, remarking,

Unfortunately, the text fails to indicate how these *ze* themselves originate ... Are they imposed on natural things and phenomena by a transcendent being or power acting as a legislator for created beings? ... Or, conversely, are the *ze* perhaps thought of as internal rules which the things and phenomena enumerated in the text obey simply because the *ze* are proper to the natures of these things and phenomena? No conclusive decision can be made between these two alternatives.⁹

² This term is translated differently by different authors. It designates a notion that is fundamental to the concept of life in ancient China. It is produced by the interaction of the two prime forces, the feminine *yin* 陰 and the masculine *yang* 陽. *Qi* animates all the 'ten thousand things', *wan wu*. In the rest of this book I shall either stick to *qi* or else follow Chan Wing-tsit, who translates it as 'material force'. The other basic notion is called *li* 理. This is the 'principle' that structures all things. It is the way that *qi* and *li* come together that determines the nature and diversity of things. For a historical view of these two notions and their evolution, see Fung Yu-lan (1952-3, Volume 2).

³ Zhang Shitong (1974, p. 85). English version of author's translation.

⁴ See *Guan zi* (Si Bu Bei Yao), *juan* 2, 1b; Fang Xuanling (1989, p. 23), English version of author's translation.

⁵ Bodde (1991, p. 336). ⁶ SCC Volume 2, p. 562. ⁷ SCC Volume 2, pp. 557-62.

⁸ Rickett (1985, p. 126). ⁹ Bodde (1991, p. 336).

This conclusion is supported by the remark that *ze*, in the purely human sphere, refers to a 'man-made rule of law', but that in the rare cases where 'the rule of Heaven', *tian ze* 天則, is used in Chinese texts, 'it seems to signify the rules or laws that Heaven has promulgated for the human (not the natural) world to follow'. The few examples to be found in the plant world incline me to an interpretation of *ze* as 'internal rules' or the 'Rules Applicable to Parts of Wholes' rather than as 'laws of Nature'. As Joseph Needham (*ibid.*) wrote, 'Universal harmony comes about not by the celestial fiat of some King of Kings, but by the spontaneous cooperation of all beings in the universe brought about by their following the internal necessities of their own natures.'¹⁰ Now we must find out to what extent this nature of plants was observed and reported on in the course of history.

(ii) *Plants, soil and climate*

It is not surprising that vegetation was regarded as related to the soil and the climate. As will be remembered, in the chapter 'Di guan si tu' 地官司徒 of the *Zhou li* 周禮,¹¹ the five kinds of soil were related to plant products, just as they were to animals and specific types of human.¹² The chapter 'Di yuan' 地員 of the *Guan zi* 管子 (produced between the -5th and the -2nd centuries), which has already been analysed,¹³ illustrates this particularly clearly.¹⁴ Each type of soil is recognised as particularly favourable to certain types of cultivation. The use of saline soils and their amelioration by the appropriate types of cultivation testify to the interest that was very early on taken in the relations between plants and the soil. According to one study,¹⁵ five of the categories of soil presented in this chapter refer to saline soils: *xi tu* 息土, *jie tu* 桀土, *hei zhi* 黑埴, *chi zhi* 斥埴 and *huang tang* 黃唐. In the first two, the advice is to cultivate rice in irrigated fields, a practice that is attested in other texts too.¹⁶ In *hei zi* soils, rice, wheat or barley can be cultivated; in *chi zhi* soils, soya, barley or wheat can be cultivated; while *huang tang* soils suit sticky varieties of *Panicum* and *Setaria* millets. This information also testifies to a recognition of the resistance properties of these plants to those environments. It was also recognised that altitude played a determining role in the presence of certain plants;¹⁷ finally, still in this same chapter of the *Guan zi*, twelve degrees (*shi-er cui* 十二衰) are defined,¹⁸ each characterised by a particular plant. Starting with the lotus, the text establishes a

¹⁰ SCC Volume 2, p. 562. ¹¹ See Lin Yin (1985, p. 97). See also pp. 34–5 above.

¹² Li Shizhen cites the part concerning plants in his introduction to the chapter devoted to fruits in the *Ben cao gang mu*. See Li Shizhen (1975–81, Volume 3, p. 1725).

¹³ This aspect, emphasised by Xia Weiyong (1981), is discussed in SCC Volume 6, Part 1, pp. 48–56. See also Li Mingqi (1980, pp. 71–4).

¹⁴ See also what has been cited on the subject of the classification of plants that is linked to the nature of the soil in the *Zhou li*, pp. 34–5 above.

¹⁵ Xian Jinshan (1991, pp. 74–5).

¹⁶ In the 'He qu shu' 河渠書 chapter of the *Shi ji* 史記, and also in the 'Le cheng pian' 樂成篇 chapter in the *Lü shi chun qiu*, according to Xian Jinshan (1991, p. 74).

¹⁷ According to Xia Weiyong (1981); see SCC Volume 6, Part 1, pp. 51–5.

¹⁸ Xia Weiyong (1981, p. 90). For a translation, see SCC Volume 6, Part 1, pp. 55–6.

sequence determined by the plants' distance from water, beginning with aquatic plants and ending with those of arid soils.¹⁹ While cultivators paid attention to the relationship between plants and the soil, its fertility, its humidity and its salinity, the influence of their exposure to light was also appreciated. It was recognised that it was possible to cultivate a large number of trees on slopes facing south, while not many suited slopes facing north.²⁰ For Li Shizhen, the nature of the soil could even account for variations in shape. In his description of sesame, *hu ma* 胡麻,²¹ he states, for instance, that the 'horns' (*jiao* 角 – fruits with a long shape), may have a variable number of edges, four, six, seven or eight, depending on the richness or poor quality of the soil. In *Hong fang* 洪範, *The Great Norm*, a text 'probably a product of the *yin-yang* and Five Elements school of the Warring States period'²² that forms part of the *Shu jing* 書經 (*Historical Classic* or the *Book of Documents*),²³ which mentions the properties associated with each of the Five Phases, we find this statement: 'The earth receives the seed and produces the harvests'.²⁴ And a little further on, we are told that all plants prosper if the rain, the fine weather, the heat, the cold and the wind arrive in a normal fashion,²⁵ which happens provided the conduct of those who govern is correct. In contrast, the Treatise on Music, *Yue ji* 樂記, in the *Li ji* 禮記 remarks, 'In an exhausted soil, the plants do not develop properly'.²⁶ A passage in the *Guan zi*, entitled 'Water and Earth',²⁷ emphasises the role that water plays in the nature of the earth:

The earth is the origin of all things and the root of the living. It is the producer of the beautiful and the ugly, worthy and unworthy, stupid and eminent. Water is the blood of the Earth and flows through its muscles and veins. Therefore it is said that water is something that has complete faculties ...²⁸

The text continues as follows: '[The water] gathers in the plants. From it the root obtains its size, the flowers their number, the fruits, their quantity'. Certainly linked with the recognised importance of the earth and the water for the plant is the determining role attributed to the root, the basis of the development of the 'ten thousand things', just as it is for the parts of plants, 'stem, leaf, branch and young shoot'.²⁹ This crucial role played by the root in the growth of plants is frequently attested. I will cite only a few examples. Ban Gu 班固 (+32–+92) declares that 'form and material force come from the roots', *xing qi fa yu gen di* 性氣發于根柢.³⁰ The representation of the character *mu*, which designates the tree in sigillary writing, and the definition of it given by the *Shuo wen jie zi* expressly refer to the root. Xu Kai's

¹⁹ See figure in Xia Weijing (1981, p. 37), reproduced as Fig. 13, in *SCC* Volume 6, Part 1, p. 56.

²⁰ Xia Weijing (1981, p. 91). ²¹ *Sesamum indicum* L. ²² Fung Yu-lan (1952–3, Volume 1, p. 163).

²³ Namely Chapter 4 of Part IV of the edition of the text by Couvreur (1935, pp. 194 f.).

²⁴ Couvreur (1935, p. 197). ²⁵ Couvreur (1935, p. 206).

²⁶ Chapter 17, in Couvreur (1913, Volume 2, p. 74).

²⁷ *Guan zi*, *juan* 14, Chapter 39, p. 134, in Fang Xuanling (1989).

²⁸ Trans. Bodde; cf Fung Yu-lan (1952–3, Volume 1, p. 166).

²⁹ *Huai nan zi*, *juan* 2, p. 56, in Liu Wendian (1989).

³⁰ *Han shu*, *juan* 100, *shang*, *xu zhuan* 敘傳, *you tong fu* 幽通賦.



Fig. 106. The Chinese character 木 *mu* (tree) in the dictionary *Shuo wen jie zi* (+121). Note the importance of the root compared with the rest of the tree. Cf Ding Fubao (1928, p. 2366a).

commentary also emphasises the relative importance of the upper part and the root.³¹ When the branches above grow by one foot, down below the root grows one foot deeper; and even writing reflects this phenomenon for – in the sigillary style of dictionary entries – the upper part and the lower part of the character are perfectly symmetrical in relation to the (virtual) level of the ground (Fig. 106). As Fan Ye 範曄 (398–446) likewise explains in the *Hou Han shu* 後漢書 (Annals of the Later Han):

The life of plants begins through the germ and the bud and it continues with the dense development of climbing stems, branches and leaves, with an abundance of multicoloured flowers. Nevertheless, that luxuriance cannot hide what it is that makes all this happen: it is the root.³²

This same idea recurs in the compilation produced by Zhu Xi 朱熹 and Lü Zuqian 呂祖謙, the *Jin si lu* 近思錄 (Reflections on Things at Hand), in an image of ‘a tree one hundred feet tall, all the parts of which, from the root and the base to the branches and the leaves, are as it were intertwined one after another’.³³ The author of the *Tong pu* (Treatise on the Tong), Chen Zhu, whose work has been discussed above,³⁴ provides information about how the root functions. On the subject of how to cultivate trees, he notes that ‘during the tenth, eleventh, twelfth and first moons, this is the moment when the leaves fall, the sap returns to the root, and the skin and the trunk no longer communicate’.³⁵ Presently, in connection with the techniques of grafting, we shall see the importance that was attached to the role of the bark in that operation. But in any case, this sentence helps us to get a better idea of Chen Zhu’s conception of the role of the root. The ‘saps’ (*zhi* 汁) that it contains and stores

³¹ Cf Ding Fubao (1928, p. 2366b).

³² *Hou han shu*, Yan Du Zhuan 延篤傳 (Fan Ye 1973, p. 2104). Translation by the author.

³³ *Zi gen ben zhi zhi ye, jie shi yi guan* 自根本至枝葉，皆是一貫, *juan* 1, 8a (Zhu Xi and Lü Zuqian, in Sao Ye Shan Fang 掃葉山房 edition). For translation, see Chan (1967, p. 26).

³⁴ Cf pp. 238–43. ³⁵ Pan Falian (1981, p. 29).

during the winter are, in the period of vegetation, to be found between the 'trunk' (*gan* 幹) and the 'skin' (*pi* 皮) and they take on a function of 'communication' (*tong* 通), which suggests that, as he sees it, this exchange is crucial for the life of the tree. Still on the role of the root, Shen Gua 沈括 (1031–95), reflecting on the best time to collect medicinal simples, proposes an interesting development in the *Meng qi bi tan* 夢溪筆談 (Dream Pool Essays) (1086).³⁶ On the subject of a successful harvest, he distinguishes between the root, the buds, the flowers and the fruit and, for grasses with hardy roots (*su gen* 宿根) – the pluri-annual herbaceous plants – he advises taking the root when there are no longer any stem or leaves, for in this case 'the liquids have returned to the root'. For grasses that do not have a hardy root – the annuals – the root is in the best condition before the flowering of the plant. To use the leaves, you have to pick them when they are starting to develop. The flowers should be picked at the start of flowering, the fruits when they are ripe. But, Shen Gua goes on, it is not enough simply to observe those dates in absolute fashion, for the environmental and climatic conditions may, in effect, introduce marked differences. For example, he points out that vegetation develops one month later in the mountains than it does in the plain. He also mentions serious distortions of the periods when fruits ripen, as a result of 'the material force of the soil', *di qi* 地氣, depending on the region. Finally, he also points out that man himself may influence the development of cultivated plants, for sowing the seeds of the same plant onto the same surface but at different times will cause future harvests to be ready at different times.

Finally, we should remember that the justification for the three basic categories that Li Yu (1611–?1680), in his *Xian qing ou ji* (Scattered Notes Made When in a Lazy Mood) (preface dated 1671), distinguishes in the plant world of trees, lianas and grasses is based on the relative depths of their roots, for these are the cause of greater or lesser longevity and robustness.

As for the relation of plants to climate, as a general rule the texts emphasise the fact that to grow a plant in a region far away from its ordinary habitat leads to upsets in its development. However, a counterexample is reported by Duan Chengshi (?803–63) in his collection of 'brush-stroke jottings', *You yang za zu* (Miscellanies of the Youyang Mountain) (c.+860). He cites remarks made by the Tang Emperor Xuan Zong in the tenth year of the Tian Bao period (+752) to his prime minister:³⁷

There have lately been planted in the palace grounds several young mandarin trees (*gan zi* 甘子) that have this autumn produced 150 fruits no different [from how they are] south of the river, in the province of Shu (Sichuan), where they come from.

To this the minister replied that the plants had a nature (*xing* 性) of their own that favoured their adaptation to the *qi* of the soil, and this was what allowed these

³⁶ See Shen Gua (1975, p. 264, no 485). On Shen Gua, the author of those notes, see Sivin (1975), Brenier et al. (1989), anon. (1985), Zhang Jiaju (1978).

³⁷ Cf Duan Chengshi (1981, p. 173).

valuable fruit trees to prosper in the palace. Nevertheless, it was also believed that the transformations that some plants undergo could even result in metamorphosis. The reader may remember a case that was analysed in detail earlier,³⁸ that of a sweet orange tree that was transformed into a thorny orange tree, a *Poncirus*, with inedible fruits, when it crossed the river Huai, to the north. A similar popular belief that circulated concerned turnips (*wu jing* 蕪菁)³⁹ in the north which, when cultivated south of the Yangzi, were changed into cabbages (*song* 菘).⁴⁰ Xu Guangqi 徐光啓, looking for plants to replace rice when harvests were poor, thought that these large roots might offer a good alternative. *Juan* 28 of the *Nong zheng quan shu* 農政全書 (Complete Treatise on Agriculture Administration) (1639) relates how he tackled the problem using both reason and practical methods.⁴¹ As he saw it, the impossibility of satisfactorily cultivating these vegetables in the south was a question not of the nature of the plants but of the cultivation methods employed. In his experimental garden in the Shanghai region, he showed that, by spreading a thick layer of fertiliser, which was a practice not used by southerners for the cultivation of cabbages, one could continue to harvest turnips with large roots. On the basis of this example and that of the sweet potato, he reckoned that he had proved that, with the appropriate techniques, plants, even when not in their original environments, could adapt to different climatic conditions.⁴²

(iii) *Plants and time*

Reading the various texts devoted to plants, one soon becomes aware of their relation to the passing of time. That may be regarded as a commonplace remark. The ancient Chinese, who operated in an agricultural civilisation in a zone of contrasting climates with four seasons, had plenty of time to observe the various phases of vegetation as well as the behaviour of animals in the course of a year. The most ancient observations⁴³ are probably those in one of the poems in the *Shi jing*,⁴⁴ 'In the fourth moon, the polygala (*yao* 蕤) flowers,⁴⁵ in the fifth the cicada (*diao* 蜩) sings.' Likewise, the mention of the period for harvesting 'jujubes in the seventh moon' and for 'rice in the tenth' gives an idea of the vegetative cycle of the plants in question. It was surely not simply by chance that one of the first decisions of the Sage-Emperor Yao, recorded in the *Shu jing* 書經 (Book of Documents), was to order his astronomers 'to determine with care and publish (in a calendar) the periods of the various labours, respectfully following the vast sky'.⁴⁶ The emperor continued by ascribing to each of the astronomers a precise task in the four given

³⁸ See SCC Volume 6, Part 1, pp. 103–16, 'The case of the *chiu* and the *chi*'. ³⁹ *Brassica rapa* L.

⁴⁰ *Brassica chinensis* L. ⁴¹ Xu Guangqi (1979, pp. 71–9). ⁴² Bray and Métaillé (2000, pp. 342).

⁴³ Zhu Kezhen and Wan Minwei (1973, p. 1).

⁴⁴ Poem 154, Qi-yue 七月, in the *You Feng* 幽風; see Xiang Xi (1986, pp. 772–4), Couvreur (1896, pp. 160–4).

⁴⁵ Taking into account various commentaries (Xiang Xi 1986, p. 553), I think that the plant *yao* may be identified as *yuan zhi* 遠志, *Polygala tenuifolia* Willd. (anon. 1977, p. 1028).

⁴⁶ Couvreur (1935, p. 3). I should like to thank Vera Dorofeeva-Lichtmann for having drawn this passage to my attention.

regions, each in a particular season. He then exclaimed, 'Who will find me a man who knows how to conform to the seasons and who should be promoted and employed?'⁴⁷ A number of passages in the *Zuo zhuan* 左傳 point out the importance ascribed to the observation of natural phenomena in order to draw prognostications from them,⁴⁸ for example at remarkable moments in the solar year, equinoxes, solstices and the start of the different seasons. This interest was not limited to plants and we are also told that the Princedom of Tan was placed under the sign of the bird: all the administrative posts bore names such as 'the swallow officer', who determined the equinoxes, 'the shrike officer' who determined the solstices, 'the sparrow officer' who determined the starts of the spring and the autumn, and 'the golden pheasant officer' who determined the start of the winter.⁴⁹ The concordance of the development of plants with the seasons is explained in the *Lü shi chun qiu* 呂氏春秋 (Master Lü's Spring and Autumn Annals)⁵⁰ (c.-239):

With the arrival of the material force of spring, the plants develop, with the arrival of the material force of autumn, they fade away. Development and fading away are not spontaneous; there is something that provokes them. Thus, when the cause is present, things cannot not be, while in its absence things cannot be. The men of antiquity had carefully observed the causes, so there was nothing that they could not use.

The chapter 'Shen shi' (Knowing the time), from the same text, explains that it is the coincidence of the period of maturity of the grain harvests with the normal period for this phenomenon that guarantees both the size of the ears and the taste and energy qualities of the seeds.⁵¹

It is without doubt the *Yue ling* 月令 (Monthly Observances),⁵² which is included in the *Li ji* 禮記,⁵³ that provides the most complete description of human activities, in particular those of the sovereign, and of natural phenomena. Thus, in the first month, 'the vapours of Heaven descend and those of the Earth rise. Heaven and Earth are in harmony and act in concert; plants grow buds'.⁵⁴ In the second month, 'the rain begins to fall, the peach tree begins to flower, the oriole sings'.⁵⁵ 'In this month the swallows return'.⁵⁶ 'In the third month of the spring, the *Paulownia* begins to flower . . . floating flowers⁵⁷ begin to grow on the surface of the water'.⁵⁸ 'In this month Heaven deploys its productive power and the heat spreads everywhere. The bent sprouts all emerge from the earth, all the buds begin to develop'.⁵⁹ In the first month of summer, 'the green frog croaks, the earthworm appears, the gourd (*wang*

⁴⁷ Couvreur (1935, p. 8). ⁴⁸ *Zuo zhuan*, *juan* 5, 8a, Xi Gong, 5th year; Couvreur (1951, p. 248).

⁴⁹ *Zuo zhuan*, *juan* 23, 24b, Chao Kung, 17th year; Couvreur (1951, Volume 3, p. 277).

⁵⁰ *Juan* 14, *shou shi* 首時; cf Lü Buwei (1989, p. 106).

⁵¹ *Juan* 26. See Li Minqi (1983, p. 41), based on the innovative work of Xia Weiying (1979a).

⁵² For a description of this literary genre, see Dong Kaichen (1981).

⁵³ *Juan* 4. This *Yue Ling* 'is an altered version of the "Annals of the monthly observances" which are seen in the *Lü shi chun qiu* and in the *Huai nan zi*' (Riegel 1993, p. 293). It can therefore be dated to at least the 2nd century B.C.

⁵⁴ Couvreur (1913, p. 336). ⁵⁵ Couvreur (1913, p. 340). ⁵⁶ Couvreur (1913, p. 341).

⁵⁷ The term *ping* 萍 has a generic sense and designates floating aquatic plants of the *Spirodela*, *Lemna* botanic genera.

⁵⁸ Couvreur (1913, p. 346). ⁵⁹ Couvreur (1913, p. 348).

gua 王瓜⁶⁰) grows and the sow thistle is in flower'. One could continue in this way for each month. Clearly, however, looking again at this document, one realises that this relation to time goes beyond phenology and fits into a much vaster concept. One may feel that the regularity of the phenological phenomena corresponds to a manifestation of the internal rules, *ze*, mentioned above. Yet the fact that the plants cannot develop unless harmony reigns between Heaven and Earth needs to be emphasised. For the manifestation of this harmony to be possible, the role played by the sovereign was considered to be crucial. For if the sovereign had ordered that in that first month of the year the prescriptions for another period should be followed, then the normal course of things would have been upset. If, for example, the rules suited to the summer had been followed, the plants would have withered away; if the rules applying to the autumn had been followed, the weeds would have proliferated; if the rules for winter had been observed, the seeds could not even have taken root,⁶¹ and so on. At the end of the prescriptions for each month, there systematically follows a description of what could happen if the sovereign ordered that the rules designed for another season of the year were followed. This indicates the crucial importance of the role assigned to the sovereign, who certainly appears as the mediator of this harmony between Heaven and Earth, the balance of which is symbolically guaranteed by the rectitude of his behaviour. As the *Treatise on Music*, *Yue ji* 樂記, likewise points out,

A truly great man uses and honours ceremonies and music; and Heaven and Earth immediately let their creative brilliance shine forth. They willingly unite their influences; the two principles *yin* and *yang* are brought together. Heaven caresses and covers all beings with its breath; the earth warms them on its bosom and nourishes them. Vegetation prospers; the bent sprouts emerge from the earth.⁶²

This concept of the mediating role of the sovereign seems to me to lend even more support to the hypothesis of the absence of any notion of universal natural laws.

Pian 52, entitled 'Shi xun' 時訓, 'Conforming with the Time', in the *Yi zhou shu* 逸周書,⁶³ presents a synthesis of earlier knowledge and beliefs relating to what might be called 'predictive phenology'. This text, which partially repeats that of the *Yue ling* (Monthly Observances), indicates the events that are in conformity with the normal course of things for each of the two-week periods that, together, form the twenty-four periods, *jie qi* 節氣, of the solar year; it then immediately describes what would happen if those normal manifestations did not take place. Here are some of the comments relating to plants. On the fifth day after *Jing zhe* 驚蜇, 'Awakening of

⁶⁰ *Trichosanthes cucumeroides* (Ser.) Maxim. ⁶¹ Couvreur (1913, p. 339).

⁶² Couvreur (1913, pp. 83–4). *Yue ji*, Chapter 17, Article III.4.

⁶³ Cf Zhu Youzeng (1878, *juan* 6, pp. 2b–5b). The original seventy *pian* of this text are no longer extant. Among the fifty-nine *pian* still existing, thirty-two are considered to have been written down 'by a single hand, in the late 4th, or early 3rd century B.C.' (Shaughnessy 1993a, p. 230). The *shi xun pian* was composed later, 'after the unification of the Qin' (*ibid.*, p. 232).

Insects',⁶⁴ plants begin to bud. For *Yu shui* 雨水, 'Rain',⁶⁵ the peach tree begins to flower. For *Gu yu* 穀雨, 'Rain for Cereals',⁶⁶ the *Paulownia* begins to flower. For *Qing ming* 清明, 'Pure Light',⁶⁷ floating plants start to grow. On the tenth day after *Li xia* 立夏, 'Beginning of Summer',⁶⁸ the gourd (*wang gua*) appears. For *Xiao man* 小滿, 'Ears Are Half-Full',⁶⁹ the sow thistle⁷⁰ flowers; five days later, the grass (*mi* 靡) dies. Ten days after *Xia zhi* 夏至, 'Summer Solstice',⁷¹ 'the mid-summer grass' (*ban xia* 半夏)⁷² grows. On the tenth day after *Chu shu* 處暑, 'End of the Dog-Days',⁷³ the millets are ripe. On the tenth day after *Han lu* 寒露, 'Cold Dew',⁷⁴ the chrysanthemums have yellow flowers. On the fifth day after *Shuang jiang* 霜降, 'White Frost',⁷⁵ the (leaves of) plants turn yellow and fall. On the tenth day after *Da xue* 大雪, 'Much Snow',⁷⁶ the iris (*li* 荔) begins to show.⁷⁷

Without seeking systematically for all similar mentions in later texts, I will simply note a few other significant markers. In the 6th century, there are references to a notion linked to the flowering of plants, namely that of 'the announcement of flowering', *hua xing* 花信. Wang Lu 王路 (*zi*: Zhongzun 仲遵), at the beginning of the fifth *juan* of his *Hua shi zuo bian* 花史左編 (preface dated 1618) (Supplement to the History of Flowers),⁷⁸ cites the twenty-four 'announcements of flowering' (*er shi si fan hua xin* 二十四番花信), taken from the *Zuan yao* 纂要 (Compilation) of Emperor Yuan 元帝 of the Liang (who reigned from 552 to 555). There were two 'announcements' each month, each at particular moments depending on the influences of *yin* and *yang*, and the hot and the cold, but the point in common was that one day before this moment, there was wind, accompanied by rain and a slight cooling in the temperature. The names of twenty-four flowers are listed but without indication of any link to a precise moment. The author even points out that only the names survive and that it is hard to link them with the twelve months of the four seasons. The following flowers are named in succession: *e er* 鵝兒;⁷⁹ *mu lan* 木蘭, lily tree;⁸⁰ *li hua* 李花, plum tree blossom;⁸¹ *dang hua* 棠花, caudate sweetleaf;⁸² *jin hua* 槿花;⁸³

⁶⁴ Nowadays, this period is the third after *Li chun* 立春. In this text, it appears in the second and would thus correspond to around 20 February.

⁶⁵ Nowadays, the second period, 'rain', is cited in the third row of the text and so would correspond to around 5 March.

⁶⁶ Around 5 April. Here too the order of the periods is reversed, with *gu yu* preceding *qing ming*.

⁶⁷ Around 20 April; see preceding note. ⁶⁸ Around 6 May. ⁶⁹ Around 21 May.

⁷⁰ Perhaps for *mi wu* 靡無 a scented umbellifer, *Ligusticum wallichii* Franchet. ⁷¹ Around 1 July.

⁷² *Pinellia ternata* (Thunb.) Breit. The tuber-shaped root of this Araceae is an important product of Chinese *materia medica* (see anon. 1977b, pp. 775–9).

⁷³ Around 12 September. ⁷⁴ Around 18 October. ⁷⁵ Around 28 October.

⁷⁶ Around 17 December.

⁷⁷ *Li* is synonymous with *ma lin* 馬蘭, *Iris pallasii* Fisch. var. *chinensis* Fisch. See Fèvre and Métaillé (2005, pp. 270, 297).

⁷⁸ See pp. 426–7 below for a description of this book. ⁷⁹ Not identified. ⁸⁰ *Magnolia denudata* Desr.

⁸¹ *Prunus salicina* Lindl.

⁸² *Symplocos caudata* Wall. (= *S. sumuntia* Buch.). See Fèvre and Métaillé (2005, p. 393). As *dang hua* is a synonym of *shan fan* 山礬, see Luo Zhufeng (1986–94, Volume 4, p. 601).

⁸³ Not identified. The synonym of *jin* and of *mu jin* 木槿 (Luo Zhufeng 1986–94, Volume 4, p. 1238) suggests identifying *jin* with *Hibiscus syriacus* L., which the presence of *mu jin* in the list rules out.

tong hua 桐花, *Paulownia* flower;⁸⁴ jin ying 金櫻, Cherokee rose;⁸⁵ le hua 梨花,⁸⁶ lian hua 棟花, China-berry blossom;⁸⁷ he hua 荷花, lotus flower;⁸⁸ bin lang 檳榔, areca palm-tree flower;⁸⁹ man luo 蔓羅;⁹⁰ ling hua 菱花, water caltrop flower;⁹¹ mu jin 木槿, althea;⁹² gui hua 桂花, osmanthus flower;⁹³ lu hua 蘆花, the flower of the reed;⁹⁴ lan hua 蘭花, orchid flower;⁹⁵ liao hua 蓼花, water pepper flower;⁹⁶ tao hua 桃花, peach tree blossom; pi pa 枇杷, flower of the loquat;⁹⁷ mei hua 梅花, flower of the Japanese apricot tree;⁹⁸ shui xian 水仙, narcissus flower;⁹⁹ shan cha 山茶, camellia flower;¹⁰⁰ rui xiang 瑞香, flower of the daphne.¹⁰¹ Following on immediately, a citation from the *Jing chu sui shi ji* 荆楚歲時記 (Annual Folk Customs of the States of Jing and Chu)¹⁰² by Zong Lin 宗懔 suggests another interpretation of these manifestations by dividing the twenty-four ‘announcements’ between eight periods, *jie qi*, the order of which corresponds to the actual order. There are thus three announcements for each one and we may assume that the order in which the plants are listed corresponds to that of their appearances. Each period of fifteen days is thus divided into three sections of five days that form so many units of time, ‘pentads’ (*hou* 候).

Xiao han 小寒, Minor Cold (c.6–20 January): Japanese apricot tree, camellia, narcissus.

Da han 大寒, Major Cold (c.21 January–3 February): fragrant daphne, *Cymbidium*, symplocos.

Li chun 立春, Beginning of Spring (c.4–19 February): winter jasmine,¹⁰³ cherry tree,¹⁰⁴ Biond magnolia.¹⁰⁵

Yu shui 雨水, Rain (c.20 February–4 March): althea,¹⁰⁶ apricot tree,¹⁰⁷ plum tree.¹⁰⁸

Qing zhe 驚蟄, Awakening of Insects (c.5–19 March): peach tree, Japanese rose,¹⁰⁹ rose bush.¹¹⁰

Chun fen 春分, Spring Equinox (c.20 March–April): blossoming apple tree,¹¹¹ pear tree,¹¹² magnolia.¹¹³

Qing ming 清明, Pure Light (c.5–19 April): *Paulownia*, barley/wheat, willow.¹¹⁴

Gu yu 穀雨, Grain Rain (c.20 April–4 May): peony bush,¹¹⁵ climbing dog rose, margoza.

⁸⁴ *Paulownia tomentosa* Kanitz. ⁸⁵ *Rosa laevigata* Michx.

⁸⁶ *Le* is a synonym of *luo le* 蘿芳 (Luo Zhufeng 1986–94, Volume 9, p. 273), and possibly of *luo le* 羅勒, an Asiatic cultivar of *Ocimum basilicum* L. See Xiao Peigen and Lian Wenyan (1988, Volume 1, p. 163).

⁸⁷ *Melia azedarach* L. ⁸⁸ *Nelumbo nucifera* Gaertn. ⁸⁹ *Areca catechu* L. ⁹⁰ Not identified.

⁹¹ *Trapa bispinosa* Roxb. ⁹² *Hibiscus syriacus* L. ⁹³ *Osmanthus fragrans* Lour.

⁹⁴ *Phragmites communis* Trin. ⁹⁵ *Cymbidium* sp. ⁹⁶ *Polygonum hydropiper* L. ⁹⁷ *Eriobotrya japonica* Lindl.

⁹⁸ *Prunus mume* Sieb. t Zucc. ⁹⁹ *Narcissus tazetta* L. var. *chinensis* Roem. ¹⁰⁰ *Camellia japonica* L.

¹⁰¹ *Daphne odora* Thunb. ¹⁰² Probably Liang, c.+550, but perhaps partly Sui c.+610.

¹⁰³ *Ying chun* 迎春, *Jasminum nudiflorum* Lindl. ¹⁰⁴ *Ying tao* 櫻桃 *Prunus pseudo-cerasus* Lindl.

¹⁰⁵ *Wang chun* 望春 *Magnolia biondii* Pamp (= *M. fargesii* Cheng), cf Fèvre and Métaillé (2005, p. 463).

¹⁰⁶ *Cai hua* 菜花. In this context, there can be no doubt that this refers to *cai hua shu* 菜花樹, synonym of *mu jin* 木槿, *Hibiscus syriacus* L., cf Fèvre and Métaillé (2005, p. 327).

¹⁰⁷ *Xing* 杏 *Prunus armeniaca* L. (= *Armeniaca vulgaris* Lam.). ¹⁰⁸ *Li* 李, *Prunus salicina* Lindl.

¹⁰⁹ *Di tang* 棣棠, *Kerria japonica* DC. ¹¹⁰ *Qiang wei* 薔薇, *Rosa* sp.

¹¹¹ *Hai tang* 海棠, *Malus spectabilis* Borkh. ¹¹² *Li* 梨, *Pyrus* sp. ¹¹³ *Mu lan* 木蘭, *Magnolia denudata* Desr.

¹¹⁴ *Liu hua* 柳花, *Salix matsudana* Koidz. ¹¹⁵ *Mu dan* 牡丹, *Paeonia suffruticosa* Andr.

Later, we find a mention of the ‘wind that announces flowering’, *hua xin feng* 花信風, in Cheng Dachang 程大昌 (*zì*: Taizhi 泰之), a native of Xiuning 休寧 in Anhui, who was active in the second half of the 12th century and who wrote a collection of brush-stroke jottings entitled *Yan fan lu* 演繁露 (Playing with the Fringe of One’s Cap). Referring to one of the commentators on the *Shuo wen jie zi*, Xu Kai (920–74), he writes, ‘In the third month, at the time of flowering, the wind is called “the wind that announces the flowers (*hua xin feng*)”’, and he adds that without a wind to announce them, the flowers will not come. Wang Kui 王達, a native of Qiantang in Zhejiang, active between the reigns of Hongwu and Yongle (1368–1425),¹¹⁶ in the chapter ‘Qi hou lei’ 氣候類 of a collection of notes entitled *Li hai ji* 蠡海集 (Measuring the Sea with a Ladle), returns to the idea of twenty-four winds that announce active blossoming only for eight periods (*jie qi* 節氣) of the agricultural calendar; they stretch from *Xiao han*, ‘Minor Cold’, to *Gu yu*, ‘Rain for Cereals’. He cites the text that I have just quoted without the slightest modification. Despite their differences, the two floral calendars are both connected to a solar division of the year, the one of twenty-four periods (*jie qi*), the other of twenty-four ‘pentads’ (*hou* 候), in eight of the preceding periods. It is, of course, no mere chance that the group of *jie qi* periods structures the agricultural calendar (*nong li*) that is based on dividing the solar year into periods of fifteen days. In this association of the plant cycle and solar time, there are other more unexpected examples, namely those that link plants to the luni-solar calendar that can show considerable variation from one year to another. A passage from the *Tai ping yu lan* reports that

in the time of Yao, a grass appeared between the steps [of his courtyard]. On every first day of a lunar month, it produced a pod, by the half-moon fifteen pods had appeared; after the sixteenth day, one pod fell off [each day] and by the end of the month none were left, except in short months, when one remained. This served as a calendar for whoever held power. Its name was *ming-jia* 莢莢, *li-jia* 歷莢 or *rui-cao* 瑞草.¹¹⁷

This plant is represented on stelae in the tomb of the Wu family of the Han dynasty (Fig. 107, also Fig. 10 above).¹¹⁸ The literal meaning of *li jia* is ‘pod-calendar’ and that of *rui cao* is ‘grass of good omen’. Other texts indicate the same phenomenon but for leaves, not pods. While the *ming-jia* marks the days, the Chinese parasol tree, *wu tong*,¹¹⁹ indicates the months, as is reported in a commentary on the *Qi men dun jia* 奇門遁甲, cited in the ‘Treatise on the Tong’, *Tong pu* (preface 1049) by Chen Zhu:

The parasol knows days, synodical months, normal years and intercalary years. It puts forth twelve leaves, six on each side [of the stem]. From the bottom you can count one leaf for each month. In intercalary years (*run* 閏), there are thirteen leaves. By observing the smallest of the leaves, one knows which is the added month.¹²⁰

¹¹⁶ Cf *Si ku quan shu zong mu*, pp. 1052–3.

¹¹⁷ *Juan* 4, citing the *Di wang shi ji* 帝王世紀, following Yuan Ke (1985, p. 398).

¹¹⁸ Cf Chavannes (1913). Cf Wu Hung (1989, p. 237, Fig. 92).

¹¹⁹ *Firmiana simplex* Wight. (= *Sterculia platanifolia* L.).¹²⁰ Pan Falan (1981, p. 73).

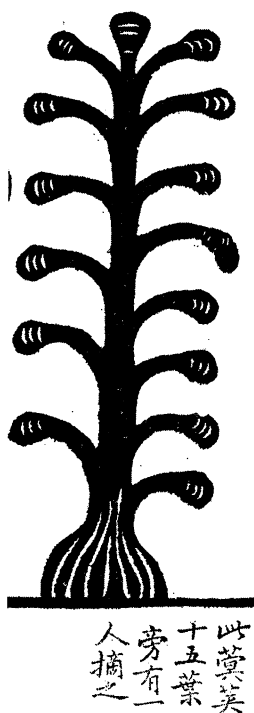


Fig. 107. *Mingjia* 莢莢, *li jia* 歷莢 or *rui cao* 瑞草, auspicious plant represented on a stele in the mausoleum of the Wu family (Han dynasty), from Feng Yunpeng and Feng Yunyuan (1821, *shi suo san* 石索三, *qian shi* 前石13).

Similarly, a text dating from the Song, the *Zhong yi bi yong* 種藝必用 (Everyman's Guide to Agriculture),¹²¹ by Wu Yi 吳惲, completed under the Yuan by Zhang Fu 張福, notes that each flower of a peony bush possesses twelve petals, but that it has thirteen in an intercalary year.¹²² Another consequence of the influence of an intercalary year is recorded in the *Quan fang bei zu*.¹²³ In a commentary on the poems of Du Fu 杜甫,¹²⁴ on the subject of a box tree, *huang yang* 黃楊,¹²⁵ it is stated that it is customary to say that it grows one inch each year, but in intercalary years it shortens by three. Certain particular days may also influence plants. The *Sun pu* 筍譜 (Treatise on Bamboo Shoots) (+970), attributed to the monk Zan Ning 贊寧 (d. 996) or to Hui Chong 惠崇 (10th century),¹²⁶ likewise a monk and a painter,

¹²¹ Literally 'What One Must Know and Do in the Art of Crop-Raising' (F. Bray, *SCC* Volume 6, Part 2). On this text, which only appears in Chapter 13 of the *Yongle da dian* 永樂大典, see Hu Daojing (1962) and Wu Yi and Zhang Fu (1963). See also pp. 406–9 in the following chapter.

¹²² Wu Yi and Zhang Fu (1963, p. 38, no 121).

¹²³ On this text, see above, p. 18.

¹²⁴ Chen Jingyi (1982, p. 1296).

¹²⁵ *Buxus microphylla* Sieb. et Zucc. var. *sinica* Rehd. and Wils. (= *B. sinica* (Rehd. and Wils.) Cheng), cf Fèvre and Métaillé (2005, p. 210).

¹²⁶ See Yong Rong et al. (1965, p. 993).

records that 'the people say that bamboos have their birthday and that it is the thirteenth day of the fifth moon. That is a favourable day to transplant them'. The *Zhong yi bi yong* indicates that when a tree gives no fruits, it is necessary to crush its root on the days for sacrifices to the god of the soil, *she ri* 社日.¹²⁷ According to another text of the 12th century, the *Fen men suo sui lu* 分門鎖碎錄, the date of sowing influences the future harvests of fruit trees. Trees sown during the first half of a lunar month will give an abundance of fruit, while trees sown in the second half will yield little.¹²⁸ Lastly, a work ascribed by tradition to Yan Di 炎帝, one of the mythical emperors, known as the Divine Agriculturalist, Shen Nong, the *Shen nong shu* 神農書, partially restored by Ma Guohan,¹²⁹ refers, in the part entitled 'Growth of the Eight Grains' 'Ba gu sheng chang' 八穀生長, to the negative or positive effects on the growth of these plants brought on by a harvesting effected on certain days of the sexagesimal cycle. Similarly, for each of the cultivated plants cited, a day is indicated when sowing should not take place. As a general rule, the period for felling trees is considered to be crucial for the preservation and quality of the wood destined for carpentry. The only exception is the *Paulownia*, *tong*, which may be felled at any moment and will still preserve its qualities.¹³⁰

(iv) *Plants and regions*

Considerations of a cosmological order defined the siting of different cultivated plants in relation to the various regions of the earth. Thus, in the reconstruction by Ma Guohan (1794–1857) of a text attributed to a *yin-yang* theorist, Fan Li 范蠡 (–4th century), *Fan zi jiran* 范子計然 ([Dialogue between] Fan and [his master] Ji Ran), we are told that 'in the east there is a great deal of wheat and barley, in the south much rice, in the west much hemp, in the north much soya, and in the centre much *Setaria* millet'.¹³¹ Fang Yizhi (1611–71) notes the sensitivity of plants, both grasses and trees, to the east, which causes them to renew growth with the material force of the spring,¹³² with the exception of the Japanese apricot tree, which is the only plant that does so ahead of them.

(v) *Plants and minerals: plants that indicate minerals*

The importance first of bronze and then of iron objects in ancient China, which is attested by many archaeological discoveries, clearly draws attention to the existence of mines.¹³³ The chapter entitled 'Di shu' 地數 (Numbers [relating to] the Earth) in the *Guan zi* states that 'one extracts copper from 467 mountains and iron from

¹²⁷ About the god of the soil, see Maspéro (1965, pp. 139–43).

¹²⁸ This manuscript, preserved in the municipal library of Shanghai, was published in facsimile in 1962 by Professor Hu Daojing, who generously sent me a copy. The passage is on p. 28a.

¹²⁹ Ma Guohan (1996, *juan* 69, pp. 2a–7a). ¹³⁰ Cf Pan Falian (1981, p. 57).

¹³¹ *Juan zhong*, 2b, in *Yu han shan fang yun shi shu*, *juan* 69. ¹³² *Wu li xiao shi*, *juan* 9, 28a.

¹³³ Yan Yu's article (1955) served as the point of departure for the next two paragraphs.

3,609'.¹³⁴ The text then indicates a way of recognising the presence of ore beneath the earth's surface, namely the colour or nature of the minerals that form on the surface of the observable soil. However, we find an interesting piece of information in an early citation taken from the first chapter, 'Quan xue' 勸學 (Exhortation to Study) by Xun Zi 荀子 (-312 to -238), which is repeated in Chapter 16, 'Shuo shan xun' 說山訓 (Information about Mountains) in the *Huai nan zi* 淮南子 (presented to the throne in -140).¹³⁵ This demonstrates the importance of relations of cause and effect, on a moral level: 'If there is jade in the mountain, the plants are humidified, if pearls are produced, the banks are not arid'.¹³⁶ Attention is, in this way, drawn to the fact that the presence of a mineral in the soil may alter the 'normal' appearance of the plants growing on its surface. The *Bo wu zhi* by Zhang Hua (+232-300) marks the next stage; the last article, 'Wu chan' 物產 (The Production of Things), in the first chapter declares, 'Those of the mountains that have sand produce gold, those that have millet produce jade'.¹³⁷ Then, moving to a different order of ideas, the text explains that, in order to obtain abundant harvests, the plants cultivated need to be adapted to the types of soil in which they grow. In the period of the Southern and Northern Dynasties (420-589), a *Di jing* 地鏡 (Mirror of the Earth) and a *Di jing tu* 地鏡圖 (Representation of the Mirror of the Earth) were produced. Ma Guohan points out that these two texts, both by authors unknown, were included in the bibliography of the history of the Sui dynasty, *Sui zhi* 隋志, classified in the category of *wu xing lei* 五行類 'cosmology'.¹³⁸ They were reconstituted from citations that had been made from them in particular in the *Kai yuan zhan jing* 開元占經¹³⁹ (The Divination Classic of the Kai Yuan period (713-42)), in the case of the former, and the *Tai ping yu lan*, in the case of the latter. The *Di jing tu* describes various ways of discovering seams of precious metals or even buried treasure. I shall now cite a few passages from it. For example, 'at the second moon, the plants are in full growth: beneath those that lean downward there is fine jade';¹⁴⁰ similarly, 'at the fifth moon, if the plants have leaves that are particularly thick and without sap, there is jade in the soil beneath the branches that hang downward'.¹⁴¹ The circumstances are also described for the eighth moon, both waxing and waning, and the twelfth. This kind of information is not limited to jade: 'In the mountains where there are Chinese onions (*cong* 蔥),¹⁴² underneath there is white, shining silver'.¹⁴³ 'If the stem of a grass is yellow when it fruits, beneath it are

¹³⁴ See Fang Xuanling (1989, p. 212).

¹³⁵ According to the 'Explanations of Commentators', 'Dian xiao shuo ming' 點校說明, p. 1, in Liu Wendian et al. (1989).

¹³⁶ A commentary (Liu Wendian et al., 1989, p. 522) explains that it is because jade is the *yin* within the *yang* that it can bring humidity to plants. On the other hand, the pearl is the *yang* within the *yin*; it is brilliant and that is why the riverbanks are not dried out.

¹³⁷ Cf Fan Ning (1980, p. 13).

¹³⁸ Ma Guohan (1996, *juan* 78, p. 16a). Anon. (1973). *Sui shu* 34, 1038.

¹³⁹ Treatise on divination of the Tang period. ¹⁴⁰ Ma Guohan (1996, *juan* 78, p. 31b).

¹⁴¹ Ma Guohan (1996, *juan* 78, p. 32a). ¹⁴² *Allium fistulosum* L. ¹⁴³ Ma Guohan (1996, *juan* 78, p. 32b).

copper objects'.¹⁴⁴ 'If the stem of a grass is red when it fruits, beneath there is lead'.¹⁴⁵ It is also reported that

when a treasure is to be found in some precinct wall, this provokes changes (*bian* 變) in the trees. As a result, if there is a tree that leans over and dries out, it is because there is treasure nearby: eight feet away from the tree if it is leaning toward the south, six feet away if it is leaning toward the east.¹⁴⁶

At the end of the Tang dynasty, Duan Chengshi, still in the *You yang za zu* (Miscellanies of the Youyang Mountain) (mid-9th century), in Chapter 16, 'Guang dong zhi yi', lists four precepts:

In a mountain, if there is Chinese onion (*cong*) above, below there is silver. If, above, there is Chinese shallot (*xie* 薤),¹⁴⁷ below there is gold. If there is ginger above, below there is copper and tin. If there is precious jade in a mountain, all the tree branches in the neighbourhood lean downward.¹⁴⁸

These examples provide a good illustration of one of the aspects of the relations that, up until the 10th century, it was thought that plants could have with minerals. One might have expected that greater systematisation would follow but, after Duan Chengshi, remarks of this kind are very rare in the literature, and Li Shizhen, for example, does no more than repeat earlier texts, as does Wu Qijun, who at the very beginning of his *Dian nan kuang shan tu lue* 滇南礦山圖略 (Illustrated Treatise on the Mines of Yunnan) repeats that 'if there are Chinese onions on a mountain, beneath there is silver'.

(vi) *Plants and minerals: plants that are sources of minerals*

Another aspect of this relationship between plants and minerals is manifested by the plants that are themselves sources of minerals. Chapter 4 of the *Bo wu zhi* (+3rd century), already cited, describes a procedure for obtaining lead and tin from artemisias: 'Leave a heap of artemisias (*ai* 艾)¹⁴⁹ for three years, burn it and lead and tin will seep out'. In order to obtain liquid mercury from purslane (*ma chi xian* 馬齒莧),¹⁵⁰ another recipe is suggested in the *Ben cao tu jing*.¹⁵¹ The text explains that there are two kinds of purslane, one with large leaves and the other with small ones: the latter is the kind most used, for it is said that

¹⁴⁴ Ma Guohan (1996, *juan* 78, p. 33a).

¹⁴⁵ Ma Guohan (1996, *juan* 78, p. 33b). In these last two examples, the term used to indicate fructification, *xiu* 秀, implies that the 'grasses', *cao*, in question are graminaceous or other herbaceous plants that produce seeds and are assimilated to the 'Five Grains'. On this subject, see p. 127 above.

¹⁴⁶ Ma Guohan (1996, *juan* 78, p. 34b).

¹⁴⁷ *Allium bakeri* Regel (= *A. chinense* G. Don).

¹⁴⁸ See Duan Chengshi (1981, p. 152). A number of passages from this text have already been cited, in particular SCC Volume 6, Part 1.

¹⁴⁹ *Artemisia argyi* Lévl. et Vant. (anon. 1977b, Fig. 1175).

¹⁵⁰ *Portulaca oleracea* L.

¹⁵¹ This text is cited in the various editions of the *Zheng lei ben cao* in *juan* 29, 'section on vegetables of the lower rank', *cai bu xia pin* 菜部下品.

in between its nodes and its leaves, there is mercury. From ten pounds of dried purslane one obtains eight to ten ounces of mercury. The difficulty lies in getting it to dry; to do so, beat it hard with a stick of *Sophora* wood,¹⁵² construct supports facing east, and expose it to the sun for two or three days, when it will be as dry as if a year had passed.

The rest of the process is described by Li Shizhen: 'It is like the residue of a combustion; one fills a jar with it and seals its opening, then buries it for forty-nine days. When one takes it out, it has all happened of its own accord'.¹⁵³ This information, on account of the detail in which the procedure is described and the fact that it is repeated by Li Shizhen some five centuries later, certainly seems to refer to a well-tested method, the more so given that Fang Yizhi 方以知 (1611–71) after him produces a special rubric on the subject in his *Wu li xiao shi* 物理小識 (Small Encyclopaedia of the Principles of Things), printed in 1664, which partially repeats the citation from the *Ben cao tu jing*, without adding any remarks of his own.¹⁵⁴ On the other hand, Song Yingxing 宋應星 (1587–1666?), at the end of the paragraph devoted to tin (*xi* 錫) in the *Tian gong kai wu* 天工開物 (The Exploitation of the Works of Nature) (1637), emphasises the fact that the procedure that he has just described is the only one for producing tin and that 'what the treatises on magic say about obtaining tin from purslane is all nonsense'.¹⁵⁵

(vii) *Plants and minerals: reciprocal actions*

According to Duan Chengshi's account, the Chinese pepper tree (*Zanthoxylum piperitum*) had the property of attracting mercury.¹⁵⁶ But other anecdotes, on the contrary, tell of deliberate interventions, with the aid of minerals, designed to modify plants. Let me begin with the most famous of them, which sets onstage the nephew of Han Yu 韓愈 (768–824).¹⁵⁷ It is again Duan Chengshi who tells the story, in *juan* 19 of the first part of his *You yang za zu*. This young man comes to join his distant uncle, Han Yu, in the capital and his insolent behaviour causes the latter to reprimand him in the following terms, translated by Robert H. Van Gulik:

'Low-class people in the street contrive to obtain clothes and food, which must be reckoned at their merit. Now you, passing your days like this, what, after all, can you do?' His nephew bowed deeply and answered placidly: 'This person has mastered one art, but unfortunately you, my uncle, do not know this'. Thereupon he pointed to the peonies growing in front of

¹⁵² *Sophora japonica* L., *huai shu* 槐樹.

¹⁵³ See *Ben cao gang mu*, *juan* 9, *jin shi* 金石 (metals – minerals), at the entry *shui yin* 水銀, 'quicksilver'. Li Shizhen (1975–81, Volume 1, p. 524).

¹⁵⁴ *Wu li xiao shi*, *juan* 7, 10a.

¹⁵⁵ Pan Jixing (1989, p. 376, n. 9) confirms the accuracy of Song Yingxing's remark. For a translation of the text of the *Tian gong kai wu*, see Sung Ying-Hsing (1966). See also an adaptation of parts of the original text, accompanied by technical commentaries, in Julien and Champion (1869, pp. 43–6).

¹⁵⁶ Cited by Schafer (1963, p. 149) in *You yang za zu*, *juan* 18; see Duan Chengshi (1981, p. 175, no 771).

¹⁵⁷ Han Yu, 'considered the greatest prose writer after Sima Qian', was one of the principal creators of the 'ancient-style' movement, *gu wen*, which aimed 'to restore to Chinese prose the simplicity, concision and vigour that it possessed in the Han period and at the end of Antiquity' (Gernet 1972, p. 257).

the hall, adding: 'If my uncle wishes those flowers to be blue, purple, yellow or red, he has but to say so!' Han Yu was greatly astonished and gave his nephew what he needed for his experiment. Then the nephew surrounded the peony shrub with a fence so that people could not see [what he was doing]. He dug a burrow all around the shrub, as deep as the roots and broad enough for a man to sit in. Then he asked for purple ore, light powder and vermilion. From morning till night he treated the roots of the shrub. After seven days he filled up the burrow again and reported to his uncle saying: 'Unfortunately, it will take some time [before the results appear]'. After one month in the beginning of winter, the peonies that had always been purple now produced flowers that were alternately white and red. On each petal there appeared two lines of a poem, clearly distinguishable in purple. This was a couplet from a poem which Han Yu had composed on an official journey – fourteen characters . . . Han Yu was greatly startled. Then his nephew took his leave and returned to Jianghuai. He never entered official life.¹⁵⁸

Even if the appearance of the characters of the poem by Han Yu on the petals seems hardly possible,¹⁵⁹ the rest of the story is more believable, for the effect on the colour of hydrangeas, for example, of the presence of iron or alum in the soil is well known.¹⁶⁰ There is another anecdote that may throw some light on this. It appears in another collection of brush-stroke jottings, the *Bei meng suo yan* 北夢瑣言 (Fragmentary Notes Indited North of [Lake] Meng) (c.950) by Sun Guangxian 孫光憲 (?900–68):

Du Ruxiu 杜孺休 was an official in Huzhou, where he saw in a pond of a house of a dyeing shop a blue lotus flower. He brought the seeds back to the capital and planted them in a pond but it turned out to be a red lotus. So he was puzzled and astonished and wrote to ask the dye-shop worker about the reason. He said: 'There are in my family jars which have been used for three generations for preparing blue dye; the lotus seeds were dipped into the bottom of the jar for over one year and then planted. But if you use the seeds from these blue lotus the lotus will turn red because they return to their original elements and it is not a strange thing'. So he posted seeds which had been dipped into the bottom of the pot to Du Ruxiu. This story was told to me by a Taoist, Dian Guangtu, who personally had seen these flowers. I have seen the *shao yao* 芍藥,¹⁶¹ which was originally pink, turn red after being manured with cock's or hen's dung mixed with earth. From this evidence we can believe what the dyer said.¹⁶²

¹⁵⁸ Translation by van Gulik (1952, pp. 15–16).

¹⁵⁹ This phenomenon should be set alongside the one observed by Father Huc. In the course of a journey through Tartary and Tibet, he had time to observe a tree 'of the ten thousand images', which had given its name, Kumbum, to the lama monastery that had been established close by. Each leaf bore a perfectly drawn Tibetan character and observers, despite all their efforts, could detect no sign of trickery (Huc 1999, pp. 221–2).

¹⁶⁰ 'The flowers sometimes turn blue, certain soils having the property of changing the normal colour, in consequence of the presence of some chemical constituent. Water, in which alum has been dissolved, is used artificially to cause the same change in colour. Iron in small quantities, as well as some other substances, mixed with the soil, are said to produce the same effect. In some gardens, plants that produce red flowers one year may develop blue ones the next, and this without any influence or skill on the part of the cultivator.' In Nicholson (1886, Volume 2, p. 162).

¹⁶¹ *Paeonia lactiflora* Pall. (= *P. albiflora* Pall.) (anon. 1977b, Fig. 1412).

¹⁶² Sun Guangxian, *Bei meng suo yan*, *juan* 10, p. 11a, trans. Joseph Needham and Lu Gwei-djen.

Contact with metal can also have another effect on a plant. *Li Shizhen* reports that when a honey locust (*zao jia* 皂莢) does not fruit, all that is needed is to tap into the trunk and put iron nails in the hole obtained in this way and pods will soon appear. This phenomenon prompts him to ask the following question: 'Might it be possible that the honey locust has a liking for iron?' *Qi zao-jia yu tie you gan-zhao zhi qing ye* 皂莢與鐵有感召之情也.¹⁶³

(viii) *Relations between plants*

A number of texts mention observations relating to the reciprocal effects of plants upon one another or report on particular associations between certain plants. One of the most ancient cases is probably that noted in the *Lü shi chun qiu*.¹⁶⁴ 'Some say that the dodder¹⁶⁵ (*tu si* 菟絲) has no root; the dodder does have a root but that root is not attached to it, it is the *fu ling* 茯苓'.¹⁶⁶ A passage in the *Huai nan zi* 淮南子¹⁶⁷ (–140) completes this citation:

[If] beneath [a pine one thousand years old] there is *fu ling*, above there is the dodder; [if] above there are tufts of yarrow (*shi* 蓍),¹⁶⁸ below there are hidden tortoises. The sage knows the interior from the exterior, and with the aid of what is visible he knows what is hidden.¹⁶⁹

More than a thousand years later, in the *Li sao cao mu shu* 離騷草木疏 (Elucidations of the Plants of the *Li sao*) (1197), *Wu Renjie* 吳仁傑 notes that when 'beneath there is a *fu ling*, above the dodder grows; this belief is today no longer viable',¹⁷⁰ which suggests, however that it was still current. Another case of an association, as noted above,¹⁷¹ is to be found in the text of the *Shuo wen jie zi*, which states that the plant named *you* 莠 grows beneath foxtail millet (Fig. 108).¹⁷² A number of commentaries explain that this *you* is the result of a transformation (*hua* 化) of the millet; it is believed to emerge from weak seeds that are sown by the wind.¹⁷³ Alongside spontaneous associations are those induced by cultivators. Thus the *Shen nong shu*,

¹⁶³ Li (1975–81, Volume 3, p. 2015). ¹⁶⁴ *Juan* 9, p. 70, in Lü Buwei (1989, p. 70).

¹⁶⁵ *Cuscuta chinensis* Lam., also *C. japonica* Choisy. ¹⁶⁶ *Poria cocos* (Schw.) Wolf.

¹⁶⁷ See *juan* 16; cf Liu Wendian, Feng Yi and Qiao Hua (1989), p. 531.

¹⁶⁸ *Achillea alpina* L. (anon. 1972–6, Volume 5, p. 500; anon. 1977b, Fig. 0010) (= *A. sibirica* Ledeb. (anon. 1979, p. 181)). The dried stems of plants of this species were used as rods in the divinatory techniques the invention of which was traditionally attributed to Fu Xi; see Granet (1934, p. 184). On the use of the rods, see *SCC* Volume 2, pp. 346–9; see also Vandermeersch (1974; 1994), Wang Dongliang (1995). I should like to thank Marc Kalinowski for having told me of these three references.

¹⁶⁹ According to the commentaries, the 'thousand-year-old-pine' was added to the original text and the logical order of the elements mentioned in the first sentence should be reversed so as to respect the parallelism of the three statements: '[if] there is the dodder above, there is the [fuling] below'.

¹⁷⁰ Wu Renjie (1965, p. 19). ¹⁷¹ Cf p. 60 above. ¹⁷² Ding Fubao (1928, p. 242b).

¹⁷³ The explanation given for the presence of these plants is interesting, for it testifies to a sharp sense of observation. The plants named *xiu* 莠 (Fig. 108a), which are without doubt an intermediary between the wild form of millet, *Setaria viridis* L. (Fig. 108b) and the cultivated form, *Setaria italica* (L.) Beauv. (Fig. 108c), as I have stated earlier (p. 61), closely resemble both the cultivated forms of foxtail millet and the wild species, *Setaria viridis*. However, as soon as one finds oneself in a field of ripe-eared foxtail millet in China, one immediately recognises them: the ears seem less full and more pliant. Hence, no doubt, the idea that they have emerged from weak seeds.



Fig. 108. Foxtail millets: (a) 'weed' (*xiu*), which grows in foxtail millet fields, from *Tong yi lu* (1804, *tu si gu ji* 圖四谷記, 5b); (b) the wild species *Setaria viridis*, from anon. (1972-6, Volume 5, p. 173); (c) cultivated foxtail millet *Setaria italica* (ibid.)

partially restored by Ma Guohan,¹⁷⁴ indicates a favourable relationship between various grains and certain trees: foxtail millet with the jujube tree, sticky foxtail millet with the elm tree, soya with the *Sophora* or the *Dolichos*, *xiao dou* 小豆 with the plum tree, sticky *Panicum* millet (*shu* 黍) with the poplar tree (*yang* 楊), buckwheat (*qiao mai* 蕎麥) with the apricot tree (*xing* 杏), hemp (*ma* 麻) with the agnus-castus (*jing* 荆), wheat (*xiao mai* 小麥) with the peach tree, and rice with the willow (*liu* 柳). In the *Qi min yao shu*, in the fourteenth *juan*, devoted to the cultivation of marrows (*zhong gua* 種瓜),¹⁷⁵ the advice given is to sow four marrow seeds accompanied 'on the sunny side' by three soya seeds. When the marrow has put forth a few leaves, the soya stems are eliminated by pinching them off. The commentary explains that

as the marrows are of a weak nature, they cannot grow on their own, which is why they need the soya to prepare the soil. When the marrows emerge, the soyas should not be

¹⁷⁴ Ma Guohan (1996, *juan* 69, pp. 2a-7a).

¹⁷⁵ See Mou Qiyu (1982, p. 111).

removed for they serve as protection against the wind for the marrows and prevent the proliferation of weeds. Once the soyas are cut, the sap that escapes from them also provides excellent humidification. They should not be pulled out, for that would weaken and dry the soil.¹⁷⁶

Similarly, in *juan* 48, 'The Cultivation of the Paper Mulberry Tree', 'Zhong gu chu' 種穀楮, it is recommended that one sow the seeds of the mulberry in the second month together with seeds of hemp.¹⁷⁷ 'In autumn and winter, the hemp should not be cut as it provides warmth for the mulberry tree'. The commentary explains that 'if it is not sown at the same time as hemp, in general the mulberry freezes in the winter'. In a treatise on the cultivation of tea, the *Bei yuan bie lu* 北苑別錄 (1186) by Zhao Ruli 趙汝礪,¹⁷⁸ one reads that the *Paulownia* has a nature that is favourable for the tea plant. It protects it from the cold in winter and the sun in summer. Associated cultivations are still practised today, for example the association of *Paulownias* with wheat¹⁷⁹ or soya¹⁸⁰ and the association of maize and groundnuts that I noticed in 1978 in the Da Zhai production brigade. In this case, the plants of maize sown earlier protect the early growth of the young groundnut sprouts and, once they are pulled up, liberate the soil and allow the shoots of the ground nuts, which are by now robust, to profit fully from the sun.

One plant may, in contrast, exert a harmful influence on another. In the *Qi min yao shu*,¹⁸¹ again, the advice given is not to associate sesame and soya, as they each make shade for the other and this results in poor harvests. The capacity of sesame to control other plants is also cited in the *Wu lei xiang gan zhi* 物類相感志 (Treatise on the Interaction of Categories of Things), a collection of notes attributed to Su Shi (1037–1101). Here, the advice is to place bundles of sesame stalks at each of the four corners of gardens of bamboo, to prevent the latter from spilling over from the spaces assigned to them. Possibly the most ancient references concern the cinnamon tree, *gui* 桂,¹⁸² and are found in the *Er ya* and the *Lü shi chun qiu*. They are recorded by Li Shizhen.¹⁸³ In connection with the synonym that he gives for *gui*, which is *qin* 檣, he cites the *Er ya*, 'if it is called *qin* 檣, that is because it can harm (*qin hai* 侵害) other trees', and he follows this with another citation, drawn from the *Lü shi chun qiu*, which justifies the preceding one, stating that 'under the branches of the cinnamon tree there are no other trees'. He also repeats what the *Lei gong pao zhi lun* 雷公炮炙論 says, 'If you push a spike from the cinnamon tree into the root of a tree, that tree dies'.¹⁸⁴ The *Pi ya* 埤雅 by Lu Dian 陸佃¹⁸⁵ (1042–1102) also refers to the harmful powers of the cinnamon tree, recording an anecdote relating to the last, fallen,

¹⁷⁶ This process is also described in the *Zhong yi bi yong* (1962, p. 25, no 48). ¹⁷⁷ See Mou Qiyu (1982, p. 250).

¹⁷⁸ The text is cited in Peng Shijiang (1992, p. 140). The text appears in Chen Zugui and Zhu Zizhen (1981, pp. 84–94, esp. 93).

¹⁷⁹ Chong Yinong (1989). ¹⁸⁰ Huguet (1980, p. 23). ¹⁸¹ *Juan* 9, *Zhong ma zi*, p. 90, in Mou Qiyu (1982).

¹⁸² *Cinnamomum cassia* Presl. According to anon. (1977b, Fig. 1790, p. 890).

¹⁸³ *Gui*, 'shi ming' 釋名 ('explain the name'), *juan* 34, Li Shizhen (1975–81, Volume 3, p. 1925).

¹⁸⁴ The *Lei gong pao zhi lun* is a lost work probably dating from the 5th century BC and compiled by the doctor Lei Xiao 雷敫, according to anon. (1981, p. 252).

¹⁸⁵ According to Xia Wuping et al. (1992, p. 74).

emperor of the Southern Tang dynasty, Li Yu 李煜 (937–78). The philologist scholar Xu Kai 徐鉉 (920–74), seeing the trouble that the ex-emperor was having with the weeds growing in a pavilion, advised him to insert fragments from a cinnamon tree between the bricks, and this killed the weeds that were growing there. This sensitivity of plants – whether with flowers or with fruits – to perfumes is frequently mentioned. In one short text, *Wu yi shuo* 五宜說 (On the Five Agreements), Han Xizai 韓熙載 (902–70) indicates the perfumes with which certain plants get on particularly well. For instance, osmanthus¹⁸⁶ (*mu xi*) agrees with camphor, the climbing dog rose¹⁸⁷ (*tu mo*) agrees with the wood of aloes, the banana shrub with musk.¹⁸⁸ Li Shizhen also records, citing the *Wu lei xiang gan zhi*, that a sliver of liquorice jabbed into a vine makes it waste away,¹⁸⁹ whereas, still citing the same source, he also notes that a Chinese bayberry¹⁹⁰ can be cured of an attack of blisters by that same process, and that if one inserts musk into the bark of a vine, the grapes have a perfumed taste.¹⁹¹ On the other hand, it seems that the antagonisms between certain perfumes and plants were particularly feared and, on various occasions, means of countering such effects are indicated.¹⁹² To battle against the perfume of musk, which is particularly aggressive, one should plant large quantities of garlic, onions and spring onions close to the plants that need protection.¹⁹³ Plants with strongly perfumed flowers may themselves likewise harm other plants. It is therefore recommended to cultivate fragrant bay (*rui xiang* 瑞香),¹⁹⁴ set well apart from other plants since ‘its perfume can harm all other plants so much that it has been called the destroyer of flowers (*hua zei* 花賊)’, as is reported in a text from the southern Song, the *Tiao xie lei bian* 調變類編 by Zhao Xigu 趙希鵠.¹⁹⁵ A number of later treatises repeat that recommendation.¹⁹⁶ As well as harming other plants with their exhalations, plants can also affect them by their secretions. The author of the treatise *Zhi fu qi shu* 致富奇書¹⁹⁷ for this reason warns against cultivating sesame close to any good plants with flowers or fruits.¹⁹⁸ However, this property may be used to good effect in assisting land clearance. Sesame, sown on uncultivated land, prevents the growth of other weeds for a year, for ‘the liquid secreted by its leaves is very bitter and kills the plants to which it adheres’.¹⁹⁹ Sesame and cinnamon are examples of antagonisms exploited in order to encourage cultivated plants and deter others that are deemed to be weeds,²⁰⁰ and

¹⁸⁶ *Osmanthus fragrans* Lour. ¹⁸⁷ *Rosa rubus* Lévl. et Vant. ¹⁸⁸ *Michelia figo* (Lour.) Spreng.

¹⁸⁹ Li (1975–81, Volume 3, p. 1885). ¹⁹⁰ *Yang mei* 楊梅, *Myrica rubra* Sieb. et Zucc.

¹⁹¹ Li (1975–81, Volume 3, p. 1798). ¹⁹² Peng Shijiang (1992, p. 140).

¹⁹³ The *Zhong yi bi yong*, for example, recommends planting a lot of garlic close to the places where flowers and medicinal plants are cultivated so that, if there was a smell of musc, the cultivated plants would not suffer. See Wu Yi and Zhang Fu (1963, p. 34, no 93, and p. 40, nos 129, 130).

¹⁹⁴ *Daphne odora* Thunb. Anon. (1972–6, Volume 2, p. 951). ¹⁹⁵ According to Peng Shijiang (1992, p. 140).

¹⁹⁶ Such as the *Qun fang pu*, the *Nong pu liu shu*, in Peng Shijiang (1992, p. 140).

¹⁹⁷ This treatise is attributed to Tao Zhuhong but the author and date of completion are unknown (Wang Yuhu 1979, p. 188) and it was very popular in the 17th century.

¹⁹⁸ *Juan* 1, 2a. Cf Xia Wuping, Tao Yanduo and Zhang Baochen (1992, p. 75).

¹⁹⁹ Peng Shijiang (1992, p. 140). *Zhi fu qi shu*, ‘Kai huang’ 開荒, *juan* 1b–2a.

²⁰⁰ These grasses, *za cao* 雜草, a term that could be translated as ‘other grasses’, ‘unorthodox grasses’, ones that are not directly part of the agricultural cycle of production, are only ‘weeds’ to the extent that they interfere with

they are those that are the most frequently cited in the literature.²⁰¹ Fang Yizhi devotes a special rubric in his collection of notes, *Wu li xiao shi*, to the procedures that make it possible to 'dry out and revive trees', *ku shu huo shu* 枯樹活樹. For example, he writes, 'If one pushes cinnamon into a tree, the tree dries up, if one waters it with liquorice [no doubt in the form of a decoction] it flourishes once again'.²⁰²

One last aspect of the relations between plants concerns the transformations that are noted in certain plants for a variety of reasons. For instance, sowing or grafting conditions are in certain cases reputed to bring about changes in parts of edible plants. The *Zhong yi bi yong*²⁰³ – once again citing the *Wu lei xiang gan zhi* – reports that the shape of a yam depends on that of whatever it is planted with. One may find tubers that resemble a hand, a hoe or a spade.²⁰⁴ Zhou Lüjing (active in the mid-16th century), in his *Qun wu qi zhi* 群物奇制, notes a procedure for preparing for the sowing of turnips that alters the taste of the harvested roots. You cut a large juicy pear in half and empty each half. You place the turnip seeds in one of those halves and then use the other half as a lid. You bury the pear and when it is dry or rotten you take the seeds and sow them. The turnips that emerge from this sowing have the round shape and the taste of pears.²⁰⁵ Another form of sympathy is reported by Li Shizhen. It concerns the vine. One can improve the taste of grapes by interweaving the stems with jujube plants.²⁰⁶ Finally, the *Quan fang bei zu* (preface dated 1253) writes of a text by Su Dongbo, who declares that the flowers of willow trees that fall into the water and remain there are transformed into duckweed *fu ping* 浮萍.²⁰⁷

(ix) *Plants and humans*

In texts earlier than the Qin dynasty (–221 to –207) one comes across references to the influence that plants can have on humans, and also to the use that humans made of certain plants in order to protect themselves against *gui* 鬼, ghosts,²⁰⁸ or *xie* 邪, harmful influences and carriers of disease.²⁰⁹

the cultivation of the 'non-weed' plants. Moreover, they too were used in various ways, as subsidiary edible plants, fodder, medicinal plants or even green fertiliser (see Zhao Huaibin (1992) for a historical view). Genetic research into the processes of domestication has revealed the crucial role that they play; on this point, see in particular Harlan (1992, Chapter 4, 'What Is a Weed?'). See also Haudricourt and Hédin (1987, pp. 101–4) and Hill (1977, p. 6).

²⁰¹ According to Peng Shijiang (1992, p. 141). ²⁰² *Juan* 9, 25b (p. 460), in Fang Yizhi (1995).

²⁰³ Wu Yi and Zhang Fu (1963, p. 27, n. 53).

²⁰⁴ This may be compared to what Theophrastus (1968, Volume 1, p. 125) reports: 'they say that, if celery is trodden and rolled after sowing, it comes up curly'.

²⁰⁵ *Yi men gang du, ti* 14, *juan* 6, 82a. ²⁰⁶ Li (1975–81, Volume 3, p. 1885).

²⁰⁷ *Spirodela polyrrhiza* Schleid. (Jia Zuzhang and Jia Zushan 1955, Fig. 1917). Chen Jingyi (1982, p. 585).

²⁰⁸ That is how the *Shuo wen jie zi* defines this term. See Ding Fubao (1928, 4058a).

²⁰⁹ I shall not tackle the symbolism of trees in myths here. On this point, and in particular the symbolism of the mulberry tree, see S. Allan (1991, pp. 27–38 and 41–8), who presents a synthesis accompanied by a precise bibliography.

In the last part of the chapter on ‘Various comments’, *Za shuo* 雜說, in the *Bo wu zhi*,²¹⁰ in a passage devoted to ‘the education of a foetus’,²¹¹ among the prohibitions affecting the future mother, the ban against eating ginger follows on immediately after that against eating the meat of a lagomorph or hare or of simply setting eyes on such animals. The sight of ginger would lead to the birth of a child with too many fingers, while the sight of a lagomorph, as, in other cultures, that of a rabbit or a hare, would cause the child to have a cleft palate. This domain of the influences of plants on human beings remains largely unexplored, but it is possible to note the important role played by reeds, which were made into brooms, *lie* 籬, in order to keep harmful influences, *xie*, at bay. Sometimes they were plaited into ropes that were hung at the doors of houses at the New Year,²¹² to ward off bad influences and ghosts. Instruments made from the wood of peach trees,²¹³ such as bows, brooms (*lie*) and walking-sticks (*zhang* 杖), had a similar function, whereas, on the contrary, seals made from the roots of peach trees made it possible to summon spirits,²¹⁴ as Li Shi 李石 (active from the first third of the 12th century onward) reports in his *Xu bo wu zhi* 續博物志, which, as its title indicates, is a ‘Continuation of the Compendium of Extensive Knowledge’ (by Zhang Hua). All this tallies with the claim that is made in the *Zhong yi bi yong*,²¹⁵ namely that this tree ‘governs all spirits (*gui*)’.

It was also believed that humans could exert an influence on plants. The *Zhong yi bi yong*,²¹⁶ for example, states that a tree with flowers or fruits that is damaged by a son in mourning or a pregnant woman will remain without flowering (in the former case) and without bearing fruit (in the latter). Similarly a fruit tree or a honey locust, knocked by a monk or a nun in the first year of its production, will yield no more fruit.²¹⁷ On the other hand, that same text tells us that to remedy the sterility of a fruit tree, one must sprinkle it with the wine offered to the spirit of the soil or, on the day of the sacrifice, sprinkle it with a gruel of cereals.²¹⁸

We have already come across an illustration of one aspect of the relations between humans and plants and the consequences that respect or disrespect for the correct seasonal customs on the part of the sovereign could have for plant growth. But as well as negative manifestations on the part of the plant world in response to some disorder or to the prince’s failure to fulfil his duties, plants could testify to his good conduct. That was the case of the mushroom, *zhi* 芝, which, as many texts declare,²¹⁹ grew when ‘the virtue of the sovereign shone on Earth’.²²⁰ Such a state of affairs was also marked by the appearance of shoots of unusual cereals bearing several ears, known as *jia he* 嘉禾, ‘beautiful cereal’, described as ‘the greatest of the Five Grains, the very essence of shining virtue’.²²¹ The *Bai hu tong*

²¹⁰ Fan Ning (1980, p. 109, no 311). ²¹¹ On this subject, see Despeux (2003).

²¹² A similar custom is practised in Japan today. ²¹³ Li Guoqiang (1994). ²¹⁴ Li Shi (1991, p. 132).

²¹⁵ Wu Yi and Zhang Fu (1963, p. 47, n. 173). ²¹⁶ Wu Yi and Zhang Fu (1963, p. 28, n. 62).

²¹⁷ Wu Yi and Zhang Fu (1963, p. 29, n. 66). ²¹⁸ Wu Yi and Zhang Fu (1963, p. 31, n. 76).

²¹⁹ A number of texts testify to this role as a plant of good omen in *juan* 48 and 49 of the ‘Cao mu dian’ in the *Gu jin tu shu ji cheng* encyclopaedia.

²²⁰ *Gu jin tu shu ji cheng*, ‘Cao mu dian’, *juan* 48, 25a.

²²¹ *Rui ying tu*, in *Gu jin tu shu ji cheng*, ‘Cao mu dian’, *juan* 23, 2b.



Fig. 109. Spontaneous grafting of two trees, *mu lian li* 木連理, represented on a stele in the mausoleum of the Wu family, from Feng Yunpeng and Feng Yunyuan (1821, *shi suo si* 石索四). The virtue of the sovereign was attested by such phenomena.

白虎通 (+79) (Comprehensive Discussions in the White Tiger Hall), attributed to the historian Ban Gu 班固 (32–92),²²² declares, ‘when the red grass²²³ grows and the trees intertwine (*mu lian li* 木連理), virtue has pervaded even the plants’. Likewise, the *Di jing tu* states that ‘when the kingdom is well administrated and the prince is happy, the trees suddenly grow of their accord’.²²⁴ On the subject of the *mu lian li* phenomenon, the spontaneous grafting of trees,²²⁵ the citation from Ban Gu attests that it was interpreted in this way quite early on; it is even represented on a stele in the tomb of the Wu family (Fig. 109),²²⁶ and also on a stele dating from +171.²²⁷ It acquired a quite important role, essentially until the Song dynasty, as a manifestation, if not a justification, of the widespread impact of the sovereign’s virtue. For this reason, one had to inform the highest authorities as soon as one noticed any sign of this good omen. Thanks to the fact that such observations were noted in the annals, Tan Bi-an has been able to draw up statistics going back a thousand years. In the two great encyclopaedias *Tu shu ji cheng* 圖書集成 and *Li xiang hui bian* 曆象彙編, he found no fewer than 254 occurrences, 59 per cent of the cases noted going back to

²²² For a description of this text, see Loewe (1993, pp. 347–56).

²²³ This is ‘a kind of grass that produces a red dye, considered by magicians to be a good omen’, in anon., *Ci yuan* (1979, Volume 2, p. 1507). Fang Yizhi identifies it as *ming jia* 蓂莢, ‘which each day puts forth a leaf and, from the middle of the month onward, loses one leaf’. See Fang Yizhi (1664, *juan* 9, 35b). The earlier definition mentioned pods, not leaves. See p. 266 above.

²²⁴ Ma Guohan (1996, *juan* 78, p. 34b).

²²⁵ I shall have more to say on this matter when considering the history of grafting; see p. 531 below.

²²⁶ See also Laufer (1911, pp. 8–10, Figs. 1, 2, 3).

²²⁷ See Tan Bi-an (1956, p. 451, Fig. 1). See also Laufer (1911, p. 7, Table 11).

the period from the beginning of the Qin (–265 to –220) down to the end of the Wei (386–550), and 20 per cent covering the years 431 to 478, in the dynasty of the Liu Song (420–79).²²⁸ No doubt in troubled times, such plant manifestations were by no means superfluous when it came to testifying to the legitimacy of rulers. The text of the *Di jing* 地鏡 notes the meanings for humans of other manifestations noticed in the plant world. Thus an out-of-season withering of the leaves of trees, bamboos or reeds always presaged grave events for governments, in particular their fall or, in the case of the whole country, an invasion. The growth of a glabrous branch on a tree was a sign of famine within the year. Many signs, such as a weeping tree or a bleeding tree, foretold the arrival of soldiers. The fruiting of bamboos could lead to disastrous consequences: if it was accompanied by a massive arrival of birds, two years later a huge famine would develop; if it was followed immediately by the bamboos drying up, there would also be a famine. Positive signs were rare.²²⁹ Plants are not the only objects that the text of the *Di jing* presents as omens, for they share this function with soils, mountains, waters and animals. Nevertheless, it seems that we can conclude that up until the Song dynasty, plants reflected affairs of state and even the well-being of the sovereign, as is further attested by an anecdote reported in the *Shi shuo xin yu* 世說新語 by Liu Yiqing 劉義慶 (403–44). An earthquake having been predicted by divination, the diviner advised the prince to go and chop down a cypress tree,²³⁰ to cut out a piece of it ‘the size of the prince’ and to lay this on a bed. This tree-trunk was destroyed by the earthquake, which prompted the leader of the prince’s armies to say, ‘Well, so you, in your turn, have entrusted to this tree the task of withstanding catastrophes’.²³¹ Another example of the direct relations between the sovereign and plants is provided by the failure of the orange trees to flower when the Emperor Xuan Zong 玄宗 was forced to retire to Sichuan.²³² While the importance accorded to spontaneous graftings, *mu lian li*, waned after the Song dynasty, on the other hand great attention continued to be paid to extraordinary cereals. The *Shou shi tong kao* 授時通考, a great compilation concerning agriculture produced on the orders of the emperor (completed in 1742), for example, devotes most of *juan* 19 to abundant citations, in chronological order, from information derived from every available source, in particular dynastic histories and local monographs on the subject of *jia he* 嘉禾, ‘the beautiful cereal’ (Fig. 110); *rui gu* 瑞穀, ‘millet of good omen’; and *rui mai* 瑞麥, ‘barley and wheat of good omen’. For example, according to the ‘Monograph of the Prefecture of Yunnan’, *Yunnan fu zhi* 雲南府志, ‘in the twenty-ninth year of the reign of Wan Li [1601], in Yimen and Kunyang, “beautiful cereals” (*jia he*) were produced with more than forty shoots on a single stem and with three or four ears, or with more than 200 shoots bearing five ears’ (Fig. 111). Remarkably enough, it was during the thirteen-year reign of Yong Zheng 雍正, who ordered the compilation of this work in the second year of his reign, that such manifestations seem to have multiplied and

²²⁸ See Tan Bi-an (1956, esp. pp. 421–2). ²²⁹ Ma Guohan (1996, *juan* 78, pp. 23–4).

²³⁰ *Cupressus funebris* Endl. ²³¹ Cited in Peyraube (1988, p. 173). ²³² Schafer (1967, p. 185, esp. n. 206).



Fig. 110. 'Excellent crop', 'beautiful cereal', *jia he* 嘉禾, from *Shou shi tong kao* (1732, *juan* 19). After anon. (1963b, p. 411).

attracted great interest from the administration, which then encouraged the systematic sowing of the seeds produced by these exceptional plants. So it was that, in the ninth month of the fifth year of the reign of Yong Ren (1723), in the two cantons of Zhejiang, Xi'an and Changshan, there appeared in non-irrigated fields exceptional shoots of foxtail millet that had two, three or four ears per stem.²³³ From that year onward, every 'beautiful cereal' produced in a province had without question to be presented to the authorities. From then on, it seems that the propitiatory aspect of such plants was valued as much as were their agronomic qualities. In this respect, we know of the interest that the Emperor Kangxi already took in exceptional cultivated plants, as his own writings tell us.²³⁴ In *Mémoires concernant l'histoire, les sciences, les arts, les mœurs, les usages, &c. des Chinois*, the authors also stress this feature of the personality of this emperor, by citing his writings.

²³³ Anon. (1963b, *juan* 19, p. 410).

²³⁴ In a recent edition of a selection of his reflections on the nature of things (Aixinjueluo 1993), ascribed to Li Di, there are a few passages on particular plants, such as the Hami melon, the vine and an assortment of foxtail millets.



Fig. 111. Example of 'beautiful cereal', the 'millet of good omen', *rui gu* 瑞穀 (*Setaria italica* (L.) Beauv.), with several spike-like panicles, from *Shou shi tong kao* (1732, *juan* 19). After anon. (1963b, p. 411).

Agriculture has delighted me ever since I began to be conscious of who I was. I have taken pleasure in cultivating before my very eyes every species of the countryside – grains, grasses, vegetables and fruit – that I could discover. When I was brought some new or particular species, I devoted extraordinary care to it. If I was successful with it, I took care that it be made known to my peoples – for instance that early rice, so that they might profit from my discovery and even improve it if possible.²³⁵

The relations between plants and animals are less often mentioned where it is a matter of wild, spontaneous vegetation. In antiquity, a special role was ascribed to the *Paulownia*, as the favourite perch of the phoenix. In contrast, the presence of snakes was always perceived negatively. The fruits of a good fruit-bearing tree were considered toxic if a snake was found nesting among its roots. The spittle of a snake made mushrooms poisonous. The fact that snakes did not like mioga ginger, *rang he* 襄荷, for Fang Yizhi confirmed its power as an antidote.²³⁶ However, as we shall see, in an esoteric domain, animals were associated in iconography with various mushrooms that possessed exceptional properties.

On the other hand, in the case of cultivated plants there are numerous examples of interactions with animals. Peng Shijiang²³⁷ records ingenious combinations that

²³⁵ Anon. (1776–91, Volume 4, pp. 476–7).

²³⁶ Fang Yizhi (1995, *juan* 9, 11b).

²³⁷ Peng Shijiang (1992, pp. 144–6).

are attested in literature. One of the most ancient cases is the raising of fish in paddy fields. The fish benefit from a protected environment and, as they feed, they reduce the weeds. A horticultural treatise from the Ming period, the *Guan yuan shi* 灌園史 by Chen Shijiao 陳時教, records how ducks and flowers could profitably coexist in the same cultivated environment. Stock-breeders constructed windbreaks with the stems of miscanthus, in the shelter of which their flocks of ducks would seek refuge on winter nights. By doing this they warmed the soil by their presence and furthermore contributed manure with their droppings, and this benefited the flowers judiciously planted along the palisades. Around fishponds, banana trees, vines, willows, peach trees and plum trees would be planted to protect the fish with their shade. Cotton rose plants, *mu fu rong* 木芙蓉, would also be planted as they were known to keep otters at a distance. The *Qi min yao shu* mentions an original procedure for tending plantations of mulberry trees. Turnips, bird rape, would be sown there, and after the harvest pigs would be introduced there, to feed themselves by rooting in the loose earth. In regions of the lower Yangzi, herds of deer would be introduced and, in search of roots, would churn up the wet soil, leaving it as mud. According to the *Tai ping yu lan*, rice sown in these conditions produced a fantastic crop. Finally, insects were also used to good effect in cultivation. Ants were – and still are – used in plantations of citrus trees to protect the trees from predatory insects.²³⁸

(x) *The properties of plants*

The interest manifested in strange phenomena reveals careful observation of plant life, which is not at all surprising in the case of cultivators, but it also introduces the idea of a norm. Normality, a notion that seems to be fundamental and is perhaps a manifestation of social conformism, is often mentioned in relation to, precisely, abnormal cases. For example, it is repeatedly stated and is also implicitly suggested that flowers all have five petals. On the subject of the gardenia, Duan Chengshi writes in the *You yang za zu* (mid-9th century), ‘rare are the plants that have six petals, only the gardenia does’.²³⁹ Citing a doctor, Li Weixi 李惟熙, who studied the ‘principles of things’, *wu li* 物理, Su Shi (1034–1101) declared in his collection of notes *Chou chi bi ji* 仇池筆記 that ‘peach trees and apricot trees that have twin kernels are deadly poisonous for people; their fruits originally have five petals, so if there are six, the kernel is obviously double. The flowers of plants all have five petals, only snow-flakes have six’.²⁴⁰ Li Shizhen repeats this claim in the *Ben cao gang mu* (1596), in connection with the apricot tree, explaining the reason for toxicity: ‘All the flowers of peach and apricot trees have five petals. If there are six petals, there is inevitably a double kernel, which is contrary to the established order; that is why it is toxic’.²⁴¹ In the *Qun fang pu* (1620), in the first *juan* of the fruits section, under the

²³⁸ See Huang Hsing-Tsung, ‘Biological pest control’, pp. 519–53, in *SCC* Volume 6, Part 1.

²³⁹ Duan Chengshi (1981, p. 174, n. 765). ²⁴⁰ Anon. [Su Shi] (1983, pp. 222–3).

²⁴¹ Li Shizhen (1975–82, p. 1730).

rubric Guo Hai 果害, 'Misdeeds of fruits', one also finds the declaration, 'fruits with flowers that have six petals inevitably have double kernels and are poisonous'.²⁴² Given the importance, in China, ever since ancient times, of fruit trees belonging to the Rosaceae family, one of the characteristics of which is having flowers with five petals, we may assume that it implicitly came to be believed that the flowers of a tree producing edible fruits had to have five petals. The case of the *Lagerstroemia*, an ornamental tree with flowers with six petals, seems to me to constitute a proof *a contrario* to this assertion. However, Fang Yizhi (1611–71), in the *Wu li xiao shi*²⁴³ (preface 1643, publication 1667), is uncertain about this subject and tries to find a rational explanation. First he cites other flowers that have six petals, such as the narcissus and the prickly ash. He thinks that the possible toxicity of fruits is not linked to the number of the flower's petals but to the fact that they may be wormy. The thing to do is to put them in water; only those that do not float are poisonous, because they carry insects. Another general characteristic of plants is mentioned by Wang Kui 王達, again in his collection, *Li hai ji* 蠹海集, namely the existence of those early leaves that botanists call cotyledons. In a paragraph entitled 'The Ten Heavenly Trunks', 'Shi gan' 十干, he describes the respective characteristics of each of the elements in this series. It is the first two that concern us here.

Jia 甲: this is the beginning of the ten thousand things, the origin of the material force that carries life (*sheng qi* 生氣). When plants begin to grow, it is by breaking through the ground that they emerge. There are always two leaves and it is between the leaves that the material force (*qi*) penetrates. This is what is evoked by the character *jia* which resembles the two leaves wrapped around each other.

Yi 乙: *jia* is *yang*, *yi* is *yin*. *Jia*, once emerged, straightens up and manifests itself above. The root must descend, weaving this way and that so as to strengthen its basis. This is what is represented by the character *yi*, which looks like the twisted form of the root of a plant [Fig. 112].²⁴⁴

(xi) *Attempts at synthesis: plant life*

This section presents information about ideas relating to plants that were current at particular moments, based on various passages from texts, many of a moral or philosophical nature, which also mention natural objects, often in order to clarify an explanation by the use of analogy. We should remember that in Chapter 9 of the *Xun zi* by Xun Qing (c. 313 to –239),²⁴⁵ 'Institutions of the Sovereign', 'Wang zhi', we are told that plants possess life (*you sheng*) but not knowledge (*wu zhi*). Cui Bao 崔豹, an official during the reign of Hui Di 惠帝 of the Western Jin (+290 to 306), notes in the *Gu jin zhu* 古今注 (Commentary on Things Old and New) the question that a certain Niu Heng asked Dong Zhongshu on the same subject:

²⁴² Cf Fan Chuyu et al. (1994, Volume 3, p. 330).

²⁴³ *Juan* 9, p. 19a.

²⁴⁴ Wang Kui (1939, p. 22).

²⁴⁵ Zhang Shitong (1974). On this important thinker, a representative of the Legalist movement, see *SCC* Volume 2.

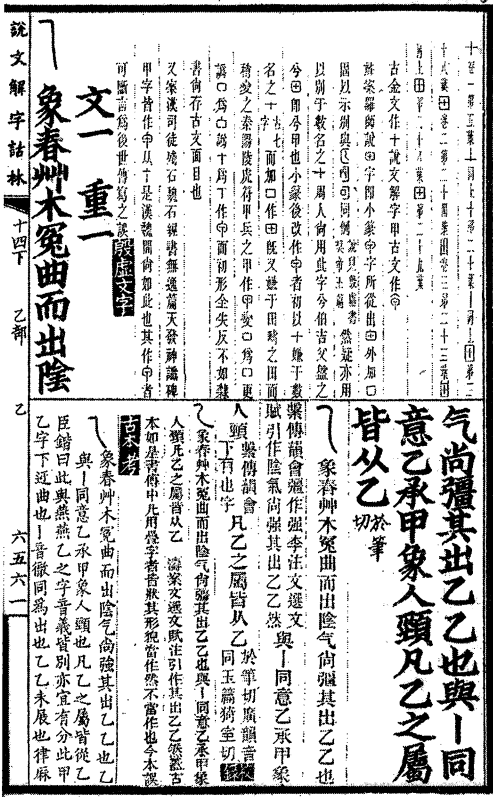


Fig. 112. The character *yi* 乙. Its tortuous lines recall the shape of a root, according to *Shuo wen jie zi* (+121), from Ding Fubao (1928, p. 656r).

‘Are plants in the same category as living things?’
‘Yes’, he replied.
‘Do they have knowledge?’
‘No’, he replied.
‘Without knowledge, how can they belong to the category of the living?’
He replied:

There are some things that possess life and knowledge, some that possess life but not knowledge, some that do not possess life but have or do not have knowledge. The first are the animals, the second plants, those without life and without knowledge are waters and lands, those without life but with knowledge are ghosts and spirits.²⁴⁶

The view, repeated by Cheng Yi 程頤(1033–1108), according to which ‘the animals possess knowledge, plants do not’,²⁴⁷ was to be modified by Zhu Xi (1130–1200),

²⁴⁶ Cui Bao (1937, p. 23).
²⁴⁷ *Dong wu you zhi, zhi wu wu zhi* 動物有知,植物無知, cf *Yi shu*, 24, 5a, cited in Forke (1938, p. 97, n. 5).

who considered, still within the framework of a continuous scale of things, that ‘plants have less knowledge than animals’.²⁴⁸ In a reply to one of his disciples about the nature (*xing* 性) of plants, Zhu Xi distinguishes amongst them ‘a principle of life’ (*sheng li* 生理), and a ‘sense of life’ (*sheng yi* 生意). Thus a piece of dead wood has no longer a ‘sense of life’ and can be thrown on the fire. But if one burns any other wood, its odour (emanations, *qi* 氣) will in each case be different according to its species, testifying in this way to a different ‘principle of life’. Hence its particular odour. When questioned further about the fact that, unlike animals, plants have no knowledge, Zhu Xi replies that ‘having blood and *qi*, the animals are endowed with knowledge but, although one cannot say of plants that they are endowed with knowledge, one generally perceives in them, in the silence, a sense of life (*sheng yi*)’. In this connection he gives the example of a tree in blossom that opens with joy to the rays of the rising sun, its buds bursting open with irresistible force, and, in contrast, that of a tree with dried-up branches and aged leaves, which seems to be feeling sad.²⁴⁹ The comparison between plants and animated beings presented a fruitful way for certain representatives of the neo-Confucian school to present their ideas. Thus Zhang Zai 張載 (1020–77) thinks that, unlike animals, which, having Heaven as a base, manifest condensation and dispersion by breathing in and out, plants, which have the earth as their base, express condensation and dispersion through *yin-yang*.²⁵⁰ Xie Liangzuo 謝良佐 (1050–1103) develops an analogy between the heart, *xin* 心, and ‘altruism’, *ren* 仁 – *ren* that he also defines as ‘that which is alive’. Then, playing on the polysemy of the term *ren*, which also designates the kernel in fruits with stones, such as peaches and apricots, he explains *ren*, ‘the kernel’, with the words ‘has the sense of possessing life’,²⁵¹ for when one plants the stones, *he* 核, of peach and apricot trees, they grow and this, to his mind, implies the idea that the kernel is endowed with a latent life. This is a view repeated by Zhen Dexiu 真德秀 (1178–1235).²⁵² Another remark in passing made by Liu Ji 劉基 (1311–75) supplies information about the influence of the environment on plants.²⁵³ Declaring that ‘Heaven cannot bring bad luck or good luck down on man, for what is good or bad luck depends on the material force (*qi* 氣)’, Liu Ji chooses to illustrate this statement by referring to plants. He writes as follows:

It is like the morning mushroom that grows by absorbing the humidity but dies amid dryness, or like the *Conioselinum*²⁵⁴ that grows in the cold but dies as soon as it feels heat . . . they grow when there is whatever agrees with them and die when the contrary is the case.

Xue Xuan 薛瑄 (1389/92–1464), in his *Du shu lu* 讀書錄,²⁵⁵ considers that

²⁴⁸ *Zhu zi quan shu*, 42/32B–33a, quoted by Bodde (1991, p. 327).

²⁴⁹ I am most grateful to Jacques Gernet for supplying me with this information.

²⁵⁰ Forke (1938, 62, n. 3).

²⁵¹ *Li xue zong quan*, 15, 26a, cf Forke (1938, 113, n. 5).

²⁵² Forke (1938, 228).

²⁵³ Cited by Forke (1938, p. 308).

²⁵⁴ Following anon. (1980, p. 581), I am interpreting *mi cao* 葇莢 as a synonym of *xiong qiong* 芎藭, *Conioselinum unvittatum* Tercz, a medicinal umbellifer that flowers in late autumn; Jia Zuzhang and Jia Zushan (1955, Fig. 560). On the translations of the names of Asiatic plants into European languages, see Métaillé (1999; 2005).

²⁵⁵ *Juan* 4, 22b; cf Forke (1938, 322).

when one observes the root of trees, one has to think that there is 'no 'before' the root but that, amid what is undifferentiated, the principle (*li*) of the root already exists and, as soon as the motor of the material force animates it, its intrinsic qualities begin to develop and the principle (*li*) conforms to this. That is how the roots of trees are produced.

Finally, still within the neo-Confucian movement, Wang Shouren 王守仁 (Wang Yangming 王陽明, 1472–1528) reports that

Zhu Benshi asked if man had an empty mind or an innate knowledge (*liang zhi* 良知), whether he was of the same category as the plants and the minerals or whether he had or had not an innate knowledge. The master answered that the innate knowledge of man was the same as that of plants and minerals and that if the plants did not have the innate knowledge of man, one could not conceive of them. Supposing it was thus only for plants and minerals, and that the Heaven and the Earth did not have the innate knowledge of man, they could not be the Heaven and the Earth; in effect, Heaven, Earth, the ten thousand things and man originally all formed one single body. The most subtle manifestation of this is the point of wonderful light in the human heart. Wind, rain, dew, thunder, sun, moon, stars and planets, animals and plants, mountains, rivers, earth and rocks, in the beginning formed but one body with man. That is how it is that all that belongs to the categories of grains and animals can serve as food for man, and that which belongs to the categories of *materia medica* and minerals can serve to heal him. It is, in effect, because they proceed from the same material force that there can be this interpenetration.²⁵⁶

However, Ye Tianshi 葉天士 (1667–1746) notes that 'since plants do not have feelings, they cannot care for illnesses from infections'.²⁵⁷ A fine argument contradicting the statement above is provided by Li Yu (1611–?1680). In his *Xian qing ou qi* (1671) (Scattered Notes Made When Feeling Lazy), he writes on the subject of *zi wei* 紫薇, crape myrtle,²⁵⁸ as follows:

Some say that animals possess knowledge and plants do not. I say that is nonsense. Animals and plants are things that have knowledge but the knowledge of animals is somewhat different from that of humans and that of plants differs from that of animals in the sense of a greater stupidity. How do we know this? Because crape myrtle fears tickling.²⁵⁹ Knowing about tickling means knowing about pain. Knowing tickling and pain is knowing honour and shame, profit and what is wrong; it is not being distant from animals, just as animals are not distant from humans. Some say that there is only one kind of tree that fears tickling but I say that that is not so. I say that plants are of the same nature (*cao mu tong xing* 草木同性), and so to observe that the nature of this tree is to feel tickling is to know that there is no grass or tree that does not know of pain or tickling but that only the crape myrtle can move; the others cannot. Some also say, how can one know that they distinguish pain and tickling, given that they do not move? I say, in comparison with humans, if you tickle a sensitive person, that person will move about. However, there are some people who do not react to tickling but does that mean that humans do not know pain and itching? Plants and animals suffer but they abstain from saying so.²⁶⁰

²⁵⁶ *Tchi Yao*, *juan* 2, 15b; cf Forke (1938, p. 394).

²⁵⁷ Cited by Fang Ling (2001, p. 16), following Wu Jutong (1985, p. 16). ²⁵⁸ *Lagerstroemia indica* L.

²⁵⁹ Many texts mention that if the bark of the tree's trunk is scratched, the leaves on the branches above move gently.

²⁶⁰ Li Yu (1985, p. 247), in the chapter 'Zhong zhi bu' 種植部 (On the Cultivation of Plants), part of *juan* 5.

As we can see, the point of correspondences, sympathy, compatibility and resonance between the various categories of things (*wu lei xiang gan* 物類相感) is very important. In a practical domain, that of grafting, it plays a crucial role. As we shall presently see,²⁶¹ the plant chosen to receive the graft and the one providing the scion to be grafted need to belong to the same *lei*, category.

(xii) *Conceptions of the global functioning of plants*

The texts cited above each provide information on one or several aspects of a plant but do not make any attempt at an overall explanation. To round off this chapter, I shall now hand over to authors who provide more detailed explanations of their concept of the nature of plant life.

Let us start with a figure whom we have already met,²⁶² Chen Jingyi, who, in the preface to the *Quan fang bei zu*, dated 1256, offers an account, influenced by neo-Confucian thought, of his concept of the genesis of the plant world:

The order is as follows: whatever are [represented by] the trigram *qian* 乾²⁶³ are trees and fruit [trees], whatever are [represented by] the trigram *zhen* 震²⁶⁴ are bamboos and rushes, whatever are [represented by] the trigram *xun* 巽²⁶⁵ are²⁶⁵ grasses,²⁶⁶ whatever are [represented by] the trigram *kan* 坎²⁶⁷ are rigid plants with numerous capitula, whatever is [represented by] the trigram *li* 離²⁶⁸ is the stem that rises up above the base, whatever are [represented by] the trigram *gen* 艮²⁶⁹ are rigid plants with numerous joints, and the fruits of trees and grasses. [Fig. 113] Root then trunk, trunk then branch, branch then leaf, leaf then flower, flower then fruit. What comes first is *yang*, what comes second is *yin*. What opens is *yang*, what gathers is *yin*. That which obtains the firmness of *yang* is the tree that resists and endures; that which receives the pliancy of *yin* is the liana that clings and climbs. There can be no *Tai ji* 太極 (Supreme Summit) without that which is *yin-yang*. Observing things in this way, is there a single fact the reason for which cannot be scrutinised right to the bottom?²⁷⁰

Another approach is described by Ye Ziqi 葉子奇 (late Yuan–early Ming) (*zi* Shijie 世傑, *hao* Jingzhai 靜齋), an eminent scholar of the Longquan 龍泉 region to the west of present-day Zhejiang. Having failed to win the approval of the founder of

²⁶¹ See pp. 505, 513, 523 below. ²⁶² See the description of this work above at pp. 18–22.

²⁶³ 'One of the eight trigrams of *The Book of Changes* (*Yi jing*) formed by three unbroken lines, corresponding to the sky, vigour, the head and the father' (anon. 1976, p. 137).

²⁶⁴ 'Trigram formed by one unbroken line beneath two broken lines, corresponding to thunder, incitement, the feet, the elder son' (Ricci 1976, p. 50).

²⁶⁵ 'Trigram formed by two unbroken lines above one broken line, corresponding to the wind, suppleness, the thigh, the elder daughter' (Ricci 1976, p. 405).

²⁶⁶ The text has 'tree', but this is probably a misprint.

²⁶⁷ 'Trigram formed by one unbroken line in between two broken lines, corresponding to running water, danger, the ear, the second son' (Ricci 1976, 490).

²⁶⁸ 'Trigram formed by one broken line in between two unbroken lines, corresponding to fire, beauty, the eye, and the second daughter' (Ricci 1976, 585).

²⁶⁹ 'Trigram formed by one unbroken line above two broken lines, corresponding to a halt, to a hand, to a mountain, to the third son' (anon. 1976, p. 509).

²⁷⁰ Chen Jingyi (1982, pp. 11–20).

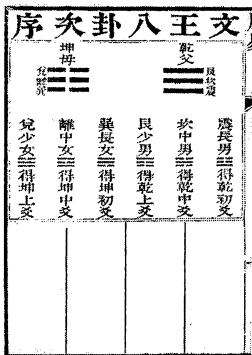


Fig. 113. The eight trigrams of the *Yi jing* used by Chen Jingyi to interpret various plant shapes. In the image they are arranged following the King Wen order. After anon. (n.d., *Yi jing*, 7b).

the Ming dynasty, Zhu Yuanzhang 朱元璋, he was given no more than a minor official position. In 1378, he was imprisoned following a trial, and during his incarceration he wrote notes that he collected together when he was released from prison. By reason of its wide views and the diversity of the subjects addressed, this little text, which he entitled *Cao mu zi* 草木子, ‘The Master of Plants’,²⁷¹ is of great interest. This text was not published until much later, in 1516, by a grandson who rearranged the original presentation. The manuscript comprised twenty-two ‘dissertations’, *pian* 篇, which were reduced to eight in four *juan* in the printed version, which seemed also to have undergone a few alterations.²⁷² The second part of the first *juan*, entitled ‘Observation of Things’, ‘Guan wu pian’ 觀物篇, frequently expresses an interest in plants. The first sentence reminds the reader that ‘Heaven produces the ten thousand things’. As for the specificities of the various categories of these things, as the text describes them, it presents an initial synthesis:

Animated beings have their origin in Heaven. That is why their heads are directed toward the sky and they inhale and exhale the material air-force (*qi*).²⁷³ The planted beings have their origin in the earth. That is why the root makes its way into the earth and makes the sap go up and down. In this way, animals obtain their material force from the sky and are carried by the earth, and plants obtain their sap from the earth and grow into the sky ... Animals originate in the sky, so their bodies are warm. Plants originate in the earth, so their bodies are cold. That is what *yin-yang* teaches us ... It is written in the *Su Wen* 素問: ‘The root of what is inside is called “positive-machine spirit” (*shen ji* 神機). If the spirit disappears, the machine is at rest. The root of that which is outside is called “material force – transformation” (*qi hua* 氣化). If the material force stops, transformation is wiped out. This applies to both animated and planted things’ ... Man grows normally [i.e. upward]

²⁷¹ Perhaps, as the contemporary editor suggests (see Ye Ziqi 1983, p. 1), the title was chosen to commemorate the plants alongside which, as the author reflects in his preface, he himself ‘had rotted’ in prison.

²⁷² This hypothesis is suggested by the contemporary editor, see Ye Ziqi (1983, p. 1).

²⁷³ Chan Wing-tsit (1967, p. 360) translates *ch’i* (*qi*) as ‘material force’ which, ‘as opposed to *li* [principle], means both “energy” and “matter”, which are not distinguished in Chinese philosophy’.

(*shun sheng* 順生), grasses and trees grow downward, flying creatures and beasts grow laterally. It is fair to say that the nature (*xing qing* 性情) of plants is not as good as that of animals, which is not as good as that of man . . . If you remove the skin of a plant, it dies. The material force (*qi*) is outside.²⁷⁴ If an animated being is wounded within, it dies. The positive spirit (*shen* 神) is held at the centre. Is there a relative value of things? Yes. Those who are born from a foetus have nine orifices. Those that are born from eggs have eight. The viviparous are therefore more precious than the oviparous. Those that are oviparous and terrestrial can open and close their eyes, which is impossible for the oviparous creatures of watery places. The terrestrial ones are more precious than those in watery places. Those that are born by transformation have neither foetus nor eggs, they are formed by the transformation of the material force (*qi*). As beings their value is tiny. So what is born from humidity is more precious than that which is born from transformation. Those are the four kinds of difference between animated beings. And what about plants? Can one extrapolate from that? Yes, it is possible to do so. There are those that are born from grafts: they belong to the category 'born from a foetus'. Those produced by seeds belong to the category 'born from an egg'. Lotus and euryale are born from wetness. Mushrooms are born by transformation. Such is the differentiation between plants in four categories. Even if one says that the number of what one calls things (*wu* 物) is ten thousand and one cannot manage to examine them all thoroughly, if one separates and differentiates, one cannot fail to find a differentiation into four kinds.²⁷⁵ If one wishes to associate and put things together, one must analyse common origins. That is what those who devote themselves to study should think about . . .

With plants, a young shoot is thin, the core is tiny. Colour, perfume, petals, leaves are transmitted and produced. After a thousand years, there is no change. Their roots and stems are born and die but, never yet, ever since the beginning, has the transmission of their positive spirit (*shen*)²⁷⁶ been extinguished. In transmission by grafting flowers and fruits, there is, above the graft, the flower or the fruit [that is grafted]. Below the graft, or when one has split [a trunk], when the buds and sprouts emerge again, in such a case it is the original flower or fruit. In this way one can see the decisive place where beings are created. The categories and material force of things are immutable . . . In the case of plants, in the tiny size of a core, colour, perfume or pestilence, flavour, flower, fruit, stem, leaf, everything without exception is contained in the kernel and when there is development again, it is absolutely identical.²⁷⁷ It is in this way that creation reveals that all kernels preserve all their functions . . .

There are some water animals (*yu* 魚)²⁷⁸ that have bones inside, others that have them outside, some have many, others few, and some have none at all. There are very many differences, but what collects them together is the water. As for the leaves of grasses and

²⁷⁴ The remarks that accompany the descriptions of grafting techniques all confirm this point. See p. 532 below.

²⁷⁵ This should probably be regarded as a reference to *si sheng* 四生, 'catur-yoni, the fourth form of birth' in Buddhism. See Soothill and Hodous (1969, p. 178).

²⁷⁶ Chan Wing-tsit (1967, p. 366): 'In Neo-Confucianism *gui shen* 鬼神 . . . more often than not refers to the activity of the material force [*qi*]. Zhang Zai's dictum, "The negative spirit [*gui*] and positive spirit [*shen*] are the spontaneous activity of the two material forces [*yin* and *yang*]" has become the general accepted definition'.

²⁷⁷ This conviction is attested much earlier, as we are reminded by an anecdote in the *Shi shuo xin yu* 世說新語 (New Anecdotes of the World), cited in the *Quan fan bei zu* (Chen Jingyi 1982, p. 1006). The producer of good plums removed the stones of the fruit that he was selling in order to prevent others from cultivating them.

²⁷⁸ In view of the text that follows this title, it is true that *yu* 魚 cannot here be translated as 'fish'. In this context, the meaning of this term certainly covers fish, crustaceae and molluscs all at once.

trees, some are large, some small, some long, some short, some^j thick, some thin, some round, some oblong, some pointed, some hairy, some slender: there is a great diversity but the similarity between them is that they all possess life (*jūn hán shēng yì yě* 均含生意也). In this way it is possible to seek out what is at the origin of the ten thousand things.

The author then proceeds to write about animals, after which he returns to the subject of plants and the problem of their essence:

Do those things that are planted have a nature of their own (*rán* 然)? The answer is yes. There are those that have leaves and branches, such as pines and cypresses. There are those that have leaves but not branches, such as the lotus and the euryales. There are those that have no leaves but do have branches, such as horsetails.²⁷⁹ There are those that have neither leaves nor branches, such as water caltrop and vetch. But that is not all. There also those that have flowers and fruits, which are like peach trees and plum trees. There also those that have flowers but no fruits, such as chrysanthemums and *Hemerocallis*. There are also those that have neither flower nor fruit such as eagle-bracken and osmund ferns. But why should there not be those that have no flowers but do have fruits? Naturally, there are such things . . . Even something that differs from everything else, man, although without it, knows about it.²⁸⁰

Of course, that last remark brings to mind the fig, which is called 'fruit without a flower', *wú huā guo* 無花果. But apart from that example, it refers back to the last lines of the chapter devoted to grasses in the *Er ya* (*juan* 13).²⁸¹ Here the reader is told, 'The flower of the tree is called *hua*, the flower of a grass is called *rong*. [For grasses] not to flower but to produce fruit is called *xiu*, and to flower but not produce fruit is called *ying*'.²⁸² The term *xiu* designates the fruiting of cereals (Fig. 114), for their flowers are not perceived as being the way that flowers should be.²⁸³ As for *ying*, which Joseph Needham considers 'no doubt a reference to infertile male flowers',²⁸⁴ as we have seen, Cheng Yaotian also uses it to name the little flowers of Compositae that he considers to be sterile petals.²⁸⁵

Not long after Ye Ziqi, Wang Kui, whom we have already met, approached the mode of life of plants from a rather different point of view:

All plants, flowers and fruit trees live if one waters them but die if the water is boiling hot. That is because water is a vital material force (*shēng qì* 生氣) but boiling water is a lethal material force (*sǐ qì* 死氣). Animals belong to the category 'above [the ground]', with a *yang* material force, which is why they breathe through the nose and the mouth. Plants belong to the category 'beneath [the ground]', with a *yin* material force, which is why roots and bulbs are hidden in the ground.²⁸⁶

²⁷⁹ *Equisetum* sp. ²⁸⁰ Ye Ziqi (1983, pp. 10, 11, 15, 17).

²⁸¹ A misprint seems to have slipped into Bretschneider's text (Bretschneider 1893, no 222, p. 103). The first character in the last line, *er*, should be replaced by *rong*.

²⁸² The definition in the *Shuo wen jie zi* (Ding Fubao 1928, 370b) repeats that last statement: 'ying, that which flowers but does not produce fruit'.

²⁸³ SCC Volume 6, Part 1, p. 106.

²⁸⁴ SCC Volume 6, Part 1, p. 106.

²⁸⁵ See p. 229 above.

²⁸⁶ Wang Kui (1939, p. 31).



Fig. 114. An example of *xiu* 秀, 'fructification of cereals', the sticky millet plant *shu* 黍 (*Panicum miliaceum* L. Beauv.). The caption says that the illustration shows the supple and loose fructification (*xiu*) of millet. From *Tong yi lu* (1804, *tu si gu ji* 圖四谷記, 3b).

Li Shizhen inserts plants into a continuous scale of things and beings going from 'waters and fire ... all the way up to man, from the most humble to the most precious'.²⁸⁷ He seems more interested in problems of arrangement and classification than in the actual functioning of living beings, which is understandable given the medical purpose of his book. So a reading of the introductory texts to each of his sections (*bu*) on plants only provides a little information about his idea of their nature. Here is what he says at the beginning of the grasses section in the *Ben cao gang mu*:

Heaven creates, Earth transforms and that is how plants grow. What is Rigid mingles with what is Supple and that is how roots and bulbs are made; the Supple mingles with the Rigid and branches and trunks are produced. Leaves and sepals depend on *yang*, flowers and fruits depend on *yin*. Consequently in grass there is tree/wood, and in tree/wood, there is grass.²⁸⁸

One can appreciate the spirit of synthesis of the author of those lines but one also realises that it remains at a very theoretical level and that a more intensive investigation is not the purpose of this work of his.

It is Wang Fuzhi 王夫之 (1619–92) who has the last word, in the following citation from a short passage that evokes the plant cycle.²⁸⁹ It is an extract from the *Zhou yi wai zhuan* 周易外傳, a text of reflections on the *Yi jing* 易經, the Book of Changes. He writes as follows:

Without germs, there are no flower buds²⁹⁰ (*rui* 蕊), without buds there are no flowers, without flowers there are no fruits, without fruit no germs. Looking deeply into things, if

²⁸⁷ See pp. 78 above. See also Métaillé (2001a).
²⁸⁸ Li Shizhen (1975–81, p. 697). The rest of the text concentrates on the the principles of the plant's functioning as *materia medica*.
²⁸⁹ My thanks go to Jacques Gernet for having brought this text to my attention.
²⁹⁰ We have already come across *rui* used to designate small but striking elements, generally the colour yellow, that appear in a flower, usually in the anthers but sometimes in the stamens. In Wang Fuzhi's text, *rui* cannot logically signify either anther or stamen, which are both parts of the flower, whereas the context clearly implies that the term designates a stage in the plant cycle. It should certainly be taken to mean 'flower bud'.

there is no *yin-yang* alternation, there is no root or stem; without the stimulation of the *yang* and the reaction of the *yin*, there can be no mutual sepal and receptacle.²⁹¹

(xiii) Conclusion

An initial conclusion is in order at this point. An understanding of plant life relies on a comparison with animated beings and this is clearly indicated by the use of a vocabulary that refers to the animal world. Living trees have bones and tendons (*gu jin* 骨筋), and once they are dead, they are made up of a body of wood (*caili* 材体).²⁹² They are enveloped in a skin (*pi* 皮) which communicates with the interior thanks to a liquid produced by the root, which is named now saliva (*jin* 津), now sap (*zhi* 汁). Zhou Lujing (16th century), in the *Lan pu ao fa* 蘭譜奧法, a treatise on painting *Cymbidiums*, to express the idea that a flower is in bud,²⁹³ uses the term *tai* 胎, which means 'to carry an embryo' specifically for a mammal. The region 'between skin and bone', where the liquids rise and fall, is considered to be essential for the life of a tree – a fact that certainly testifies to careful observation of this zone, even if the explanation given by Ye Ziqi still refers to animals. As for the way in which the life of plants evolves, the explanation lies in particular in the direct influence of the interplay of the two fundamental influences *yin* and *yang* throughout the seasons and also in the action of the Five Phases (*Wu xing* 五行). The effect of this action is perceived at very different levels. One example is provided by the notes of Shen Huaiyuan 沈懷遠, a scholar exiled in southern China during the years 454–64. Upon his return to what is now Zhejiang, in 465, he composed a Monograph on the Yue of the South, *Nan yue zhi* 南越誌, in which he describes the exploitation of the lacquer trees, *qi shu* 漆樹.²⁹⁴ He reports that in the present-day province of Guangdong, men climbed up the trees that were twenty or so yards tall, in order to cut into them. 'To obtain a good result', he writes, 'one has to start at cock-crow as the sun rises. After that moment, the female force (*yin qi*) disappears and the male force (*yang qi*) rises and then one can no longer extract anything'.²⁹⁵ Wang Kui, some ten centuries later, in the section of the *Li hai ji* that he devotes to the 'category of all the things', *shu wu lei*, provides an explanation for this phenomenon. He explains that when a spring flower withers, it is carried away by the wind, whereas an autumn flower withers on the spot. The reason for this difference is that the former receives a 'scattering' material force (*fu zhang*) whereas the latter receives a 'concentrating' one (*shou lian*). He then asks himself why, when the colour that corresponds to wood within the framework of the Five Phases is the *qing* bronze green, all plants are, in fact, *lü* green. The answer that he comes up with is that

²⁹¹ *Zhou yi wai zhuan*, juan 2, 15b.

²⁹² Cf Chen Zhu, *Tong pu*, juan 2, in Pan Falian (1981, p. 13).

²⁹³ Zhou Lujing, *Lan pu ao fa*, p. 1.

²⁹⁴ *Toxicodendron vernicifluum* (Stokes) F. A. Barkley.

²⁹⁵ Mou Qiyu and Qiu Zeqi (1990, pp. 135–6).

green is in between yellow and bronze green and the earth (= yellow) nourishes the wood (= bronze green). In other words, the dark green is applied to the yellow and produces green. Still within the register of colours, he points out that it is said that the flowers of plants possess all the five colours whereas, in reality, there are no black ones. Nevertheless, black is present, though not apparent, for it corresponds to water, the nourishing mother, that is hidden within.²⁹⁶

(xiv) *An external but close view: Kaibara Ekiken*

I thought that, at the end of this section, in order to provide a synthesis of established bodies of knowledge relating to plants in China in the late 17th century, it would be interesting to hear from a contemporary author produced by the same culture but with a 'distant' and critical view: the neo-Confucian Japanese scholar Kaibara Ekiken 貝原益軒 (1630–1714),²⁹⁷ who relates this Chinese knowledge to his own culture. In a Foreword to his great pharmacopoeia *Yamato honzo* 大和本草 (The Natural History of Japan)²⁹⁸ (1709), there is a 'Discussion on the Principle of Things', 'Buzuri o Ronzu' 論物理,²⁹⁹ that describes his own naturalist knowledge, which is for the most part founded on Chinese sources. With this text, he is, in fact, the first to propose a kind of treatise on Chinese natural history. That is why, despite the length of this text and the inevitable repetitions of material that we have already read, the part of this document that is devoted to plants seems to me to merit being presented as an annexe to this section devoted to knowledge relating to plant life. Kaibara reproduces the observations made by Ye Ziqi in the *Cao mu zi* on the subject of the four ways of coming into the world and the relative value of the beings that result. He then turns to plants:

The fact that, when the spring arrives, all trees put forth buds, that in summer their branches develop, that in autumn the leaves dry and that they fall in winter, and that fruits ripen is the constant principle followed by the periods of growth and the preservation of *yin-yang*. There are some trees whose leaves become thick and hard that do not dry up in the autumn. These are evergreen leaves. For grasses, the constant principle (*chang li* 常理) is also to be born in the spring, grow in summer, produce fruit in the autumn and dry up in the winter. But there are also many that grow not in the spring but in the summer, autumn or winter. Among those that grow in the summer, there are the begonia,³⁰⁰ the cockscomb,³⁰¹ the amaranths, ginger and all the bamboos. There are also those that grow in autumn, develop in winter and spring and dry up in summer, for example the narcissus,³⁰² the

²⁹⁶ Wang Kui (1939, p. 14).

²⁹⁷ See in particular Horiuchi (1994) on Kaibara's appreciation of the work of Li Shizhen. See also p. 330 below.

²⁹⁸ I am using the 1975 edition annotated by Shirai. ²⁹⁹ Kaibara Ekiken (1975, pp. 7–27).

³⁰⁰ *Begonia evansiana* Andr. (Jia Zuzhang and Jia Zushan 1955, Fig. 0065; Makino Tomitaro 1970, p. 412). = *Begonia grandis* (Wright 1984, p. 424).

³⁰¹ *Celosia cristata* L. (Jia Zuzhang and Jia Zushan 1955, Fig. 1508; Makino Tomitaro 1970, p. 133).

³⁰² *Shui xian*, *Narcissus tazetta* L. var. *chinensis* Roem. (Jia Zuzhang and Jia Zushan 1955, Fig. 1810; Makino Tomitaro 1970, p. 861).

Chinese cabbage,³⁰³ the turnip,³⁰⁴ shepherd's purse,³⁰⁵ spinach, barley and wheat. These are born at the moment of the severity of the material force *yin* and they dry at the moment of the growth of the material force *yang*. Among plants, there are some that flower in spring and summer and others that do so in autumn and winter. In the course of the four seasons of a year, there are no plants that do not flower. It is in the spring that there are most of them, next come the summer and autumn ones, whereas there are very few that flower in winter. The only ones to do so are the Japanese apricot tree,³⁰⁶ the camellia,³⁰⁷ an apple tree,³⁰⁸ the winter chrysanthemum,³⁰⁹ the Japanese medlar or loquat,³¹⁰ the narcissus, the wintersweet³¹¹ and the winter jasmine.³¹² In autumn and in winter, in the frost and snow, when grasses and trees are all dried up, it is a strange thing to see these plants in full bloom. Dong Zhongshu 董仲舒 says: The 'draba' [Whitlow grass]³¹³ dries in the second moon of the summer (*zhong xia*), the coltsfoot in the depths of winter. Wei Yingwu 韋應物 says in a poem that when the white frost affects all the grasses, only the chrysanthemum has splendid flowers. Lin Hejing 林和靖 also says, in a poem about a Japanese apricot tree, that it displays all its beauty when all the other flowers have fallen.

The fruits and seeds of trees, grasses and cereals mostly ripen in the autumn. There are also some that ripen perfectly in winter, namely the citrus fruits. There are some that are ripe in summer, such as cherries, loquats, beans, barley and wheat, and peas. Only in the spring is it unusual for things to ripen. The jujube puts forth its leaves in summer whereas the natural principle is for leaves to appear in the spring. So that is an exception.

All flowers in general have five petals.³¹⁴ There are also some with six, four or two petals. When the flowers that normally have five petals instead have six, the stone of their fruit has two kernels. The hortensia flower,³¹⁵ like the forsythia,³¹⁶ has four petals. As well as those two cases, there are other flowers with four petals. The flowers of the gardenia and the belacanda all have six separated ones, while the flower of the saxifrage³¹⁷ only has two salient parts. All kinds of fruits come after the flowering. Only in the category of marrows and gourds do the flowers come after the fruit.³¹⁸ For the lotus, the flower and the fruit form together. Male hemp, which has flowers, has no fruits; female hemp has fruits but no

³⁰³ Song, *Brassica campestris* L. ssp. *chinensis* (L.) Makino var. *communis* Tseng et Lee (He Kang 1990, p. 2).

³⁰⁴ *Man qing*, *Brassica campestris* L. ssp. *rapifera* Matzg. = *Brassica rapa* L. (He Kang 1990, p. 289).

³⁰⁵ *Ji cai*, *Capsella bursapastoris* Moenj. (Jia Zuzhang and Jia Zushan 1955, Fig. 1272).

³⁰⁶ *Umei* (Jap.), *mei* 梅 (Chin.), *Prunus mume* Sieb. et Zucc.

³⁰⁷ *Shan cha* 山茶, *Camellia japonica* L. (Jia Zuzhang and Jia Zushan 1955, Fig. 0709; Makino Tomitaro 1970, p. 392).

³⁰⁸ *Hai hong* 海紅, *Malus spectabilis* Borkh. = *Pyrus spectabilis* Aiton. (Jia Zuzhang and Jia Zushan 1955, Fig. 1077).

³⁰⁹ *Han ju* 寒菊, *Chrysanthemum indicum* L. var. *hibernum* Makino (Jia Zuzhang and Jia Zushan 1955, Fig. 0054; Makino Tomitaro 1970, p. 648).

³¹⁰ *Pi pa* 枇杷, *Eriobotrya japonica* Lindl. (Jia Zuzhang and Jia Zushan 1955, Fig. 1071; Makino Tomitaro 1970, p. 258).

³¹¹ *La mei* 腊梅, *Chimonanthus praecox* (L.) Link., in anon. (1977b, Fig. 5328) (= *Meratia praecox* (L.) Rehd. et Wils.). In anon. (1979, p. 195).

³¹² *Ying chun hua* 迎春花, *Jasminum nudiflorum* Lindl. (Jia Zuzhang and Jia Zushan 1955, Fig. 0458; Makino Tomitaro 1970, p. 490).

³¹³ *Ting li* 葶藶, *Draba nemorosa* L. var. *hebecarpa* Ledeb. (Jia Zuzhang and Jia Zushan 1955, Fig. 1279).

³¹⁴ The text has, literally, 'five striking parts', *wu chu* 五出.

³¹⁵ *Zi yang hua* 紫陽花, *Hydrangea macrophylla* (Thunb.) Seringe (= *H. opuloides* K. Koch, *H. hortensia* DC.). In the case of this flower, what Kaibara – along with non-botanists generally today – considers to be petals are, in actual fact, sepals.

³¹⁶ *Lian gao hua* 連翹花, *Forsythia suspensa* (Thunb.) Vahl. (anon. 1972–6, Volume 3, p. 347).

³¹⁷ *Hu er* 虎耳, *Saxifraga stolonifera* Meerb. (= *S. sarmentosa* L.) (Makino Tomitaro 1970, p. 231).

³¹⁸ When the fruit begins to grow, the flower survives for a while, which may account for this remark.

flowers. There are numerous trees in this category, such as the fig tree. There are also many plants that have flowers but no fruits.³¹⁹ As for trees, such as the prickly ash, the male has flowers but no fruits, and the same applies to spinach. Among all plants there are males and females and among the males, there are no seeds.

All climbing plants rotate to the left. Their twisting toward the left follows the sky. Twisting toward the left consists in starting from the left, above, and descending toward the right. The path of the sky turns to the left. The sun, the moon the stars, for a man with his back to the north and facing the south, go from the left, the east, to the right, the west. The course of the sun, the moon and the stars is toward the west. This movement to the west is correct; it is the direction in which a pan for roasting tea turns, as do climbing plants. The opposite direction is hardly ever found either in the movement in pans or in the twisting of plants.

The natures of plants are very diverse. The growth of all plants is in accordance with the four seasons and the twelve months. The same applies to soils, yellow or black clay, sandy terrains, soils in the shade and soils in the sun. Dryness, humidity, water and earth all have their affinities. As for manures, there are some that are suitable and others that are not. The relationship between plants and the soil is what is said in the Classic on Filial Piety: 'Use the path of the sky for the benefit of the earth'. That is the method for cultivating plants. It cannot be ignored.

It is said that beasts are the *yin* of the sky, plants are the Supple of earth. *Yin* and what is Supple are in the same category, which is why the fur of beasts is like the stems of grasses. Birds are the *yang* of the sky, trees are the Rigid of the earth. *Yang* and what is Rigid are in the same category, which is why the feathers of birds are like the leaves of trees.

It is said in the *Shuo yuan* 說原 that man grows normally, plants grow upside down and animals grow laterally. That is why plants have no knowledge, animals do have some knowledge but not completely, whereas there is no human being without knowledge.

It is also said that animals are based in the sky, their heads are in the direction of the sky and it is air that they inhale and exhale, whereas plants, which are based in the earth, have their roots in the direction of the earth and it is sap that they draw up and down. So animals take air from the sky and are carried by the earth, while plants take their sap from the earth and live in the sky. That which is based in the sky has a warm nature; that which is based in the earth has a cold body.

Things that live in the earth, their number is five, which is why plants all have [flowers with] five petals. Those flowers of peach and apricot trees that have six petals necessarily produce double kernels, all of which can kill people.

When the process of creation (*zao hua* 造化) is not complete, things are not fully accomplished. Plants that have abundant flowers have few fruits, those that have abundant fruits have miserable flowers . . . The Japanese apricot tree, the cherry tree, the apple tree, roses, camellias and peonies have beautiful flowers but their fruits are inedible. The flowers of kerrias and narcissi are beautiful but they have no fruits. The same goes for double flowers; they have no or very few fruits. Those that have fine fruits, such as the apricot tree, the chestnut tree, the jujube tree, melons, mandarin trees and orange trees, do not have beautiful flowers.

Bamboos are not grasses and not trees, but form a kind apart, as Dai Kaizhi says. Among the animals, only fish are neither beasts nor birds. Just as among the plants there are grasses, trees and bamboos, among the animals there are birds, beasts and fish. So among plants

³¹⁹ An allusion to the definitions to be found in the *Er ya* and the *Shuo wen jie zi*. See p. 127 above.

and animals respectively there are those three ranks. Furthermore,³²⁰ among the plants there are mosses and mushrooms that are very small and cannot be compared with grasses, trees and bamboos. In the category of animals, there are also insects (*chong*) and animals with shells, very small animals that cannot be compared to birds, beasts and fish. Just as among the animals there are insects and animals with shells, so too among the plants there are mosses and mushrooms.

In between the sky and the earth there is nothing that lies outside the fundamental principle (*li* 理).

Among the grasses, the trees and the bamboos, there are males and females. The males have no fruits, the females do have fruits. Although leaves and branches are similar, those that do not produce fruit have more of them. This shows that among plants, there is also *yin-yang*.³²⁰

That last remark leads me, logically, now to turn to the question of sexuality among plants.

(2) ON THE SEX OF PLANTS

Every being is born from the union of male and female seed 男女構精, 構萬物化生
Yi jing 易經³²¹

There are males and females among all the trees. The males, for the most part, do not produce fruit

Yu Zongben 俞宗本, late 14th century

Among all plants there are males and females; among the males there are no seeds
Kaibara Ekiken 貝原益原, 1704

Our claim is that at the beginning of things there were uniquely created two Sexes of all living species

Linnaeus (1788 (first edn 1751), p. 112)

(i) A historical reminder

As a prelude to this section, devoted to the way in which Chinese texts have accounted for the real or supposed sexuality of plants, I would like briefly to note a few points necessary for an understanding of what follows. It was after the pioneering works of Marcello Malpighi (1628–94), *Anatome plantarum* (1675–9), and Nehemiah Grew (1641–1712), *Anatomy of Plants* (1682), along with the research work of Rudolph Jakob Camerarius (1665–1721), *De sexu plantarum* (1694), which was continued by that of Sébastien Vaillant (1669–1722), *Discours sur la structure des fleurs* (1717),³²² that the mechanisms for reproduction among the upper plants were

³²⁰ Kaibara Ekiken (1975, p. 10). Trad. Auct. ³²¹ *Yi jing, Xi ci, xia*, French translation Gernet (1982, p. 308).

³²² See Morton (1981, Chapters 6 and 7). For an introduction and an English translation of Vaillant, see Bernasconi and Taiz (2002).

observed and that the fundamental role of the flower in this process was explained. From that point on, this part of plants, previously considered simply for its form or beauty, took on a very particular meaning that was linked with its role in the reproductive function and each of its components also came to be considered from a functional point of view,³²³ as we are reminded by the three quotations that follow:

In the language of botany, we give the name *flower* to the whole collection of organs for fecundation among the Phanerogames grouped at the extremity of the same axis.³²⁴

The flower is that local and transitory part of the plant that results from the presence of the male organ or the female organ or both of them together, either naked or equipped with envelopes or with one floral envelope only, with no sexual organs inside it.³²⁵

The parts of a typical flower are sepals, petals, stamens and carpels, all attached to the receptacle. A flower with all four sets of floral leaves is said to be a complete flower. An incomplete flower is one in which one or more of the four sets are lacking.³²⁶

Among the incomplete flowers one finds some that have stamens but no carpels or vice versa. Such flowers are said to be unisexual. Most plants with flowers possess bisexual flowers. However, there are also plants that have distinct male and female flowers. In a case in which the flowers are carried by the same stem, the plants are said to be monoecious. When the male and female flowers of a plant of the same species are to be found on different individual plants, these plants are called dioecious, so today, by considering the sex of the flowers that they carry, we recognise female plants and male plants, as for example among dog's mercury plants. We may well wonder what the situation was before the recognition of plant sexuality, which was not clearly demonstrated until the 18th century, as is noted above. Before that time, the attribution of the adjectives 'male' and 'female' among the botanists of antiquity and the Western Renaissance depended on criteria very different from those of modern botany. For instance, speaking of trees, Theophrastus (c. 371-c. 286) wrote as follows: 'Again, the "male" trees have more knots than the "female" in those trees in which both forms are found, as cypress silver-fir hop-horn-beam cornelian cherry – for there is a kind called "female cornelian cherry" (cornel)'.³²⁷ Pliny the Elder (+23-79), in the third chapter of Book 13, entitled 'On the Nature and Properties of Date and Palm Trees and Their Species', writes as follows:

The most devoted students of nature report that trees, or rather indeed all the products of the earthy and even grasses, are of both sexes . . . although in no trees is it more manifest than in the palm. A male palm forms a blossom on the shoot, whereas a female merely forms a bud like an ear of corn, without going on to blossom.³²⁸

³²³ This discovery also played an important role in the history of systematic classification, for Linnaeus founded his method on the number and relative disposition of the male and female parts of the flower.

³²⁴ Germain de Saint-Pierre (1870, p. 550). ³²⁵ Bailly de Merlieux (ed.) (1826, Volume 1, p. 153).

³²⁶ Weier, Stocking and Barbour (1970, p. 280). ³²⁷ Theophrastus (1968, Volume 1, p. 57). Trans. Hort.

³²⁸ Pliny, trans. H. Rackham (Loeb Classical Library), xiii, 7.

These two quotations alone show that the attribution of distinct sexes was not limited to dioecious plants. As for the criteria of differentiation, texts from the Renaissance present these in greater detail. Otto Brunfels (1464–1534), the author of *Herbarum Vivae Eicones* (1530), used the terms ‘male’ and ‘female’ to indicate differences in the colours of flowers between two plants with similar forms. In general, the darker one was considered to be ‘male’.

In other cases the normal or more complete plant was considered as male, the abnormal or imperfect one as female, as in *Polygonum bistorta* L., and *Listera ovata* L. and *Ruscus hypoglossum* L. Normal *Listera ovata* was originally styled *Perfoliata mascula*, but when it was discovered that it was a spurious kind, it was designated *Perfoliata foemina* in contrast with the genuine kind, *Perfoliata vera* (*Bupleurum rotundifolium* L.).³²⁹

It seems that for Leonhart Fuchs (1501–66) the terms ‘male’ and ‘female’ made even less sense; for example,

he had two kinds of *Balsamine*, and called them ‘male’ and ‘female’, respectively, merely in order to distinguish them. He reversed Brunfels’s allocation of sexes to the violet-flowered *Verbena officinalis* and the yellow-flowered *Sisymbrium officinale*, designating the former as ‘female’ and the latter as ‘male’, because he supposed that Pliny had applied these terms in that way.³³⁰

On the other hand, in his *Phytognomica* (1588), Giambattista Porta (c.1535–?) indicates a certain number of criteria for distinguishing the two sexes in plants. Applying the Doctrine of Signatures, he devoted Chapter 17 to the relations that could be established between humans of both sexes and male and female plants, for he considered that it was important in medical practice to use, for preference, the former for men and the latter for women. On the basis of the moral and physical qualities attributed to humans, he defined the attributes of each sex among plants:

In the same way, among trees, the male grows tall, is firm with branches that are dense, vigorous, woody, lively, knotty, hard to break, with coloured wood and rugged bark.³³¹ Even if it is not sterile for most of the time, it produces only a few fruits, that have a harsh taste, are perfumed and form very slowly. It is to be found in forests. In truth, the female tree, on the contrary, is not very tall, is wide, thick, with wood that is soft, weak, very tender, without knots, sluggish, colourless, with bark that is smooth and regular, fruits that are large and fleshy, odourless and tasty, in a word the tree looks nice and flourishes. It is to be found close to towns and in cultivated places.³³²

Of the few examples that he cites, I shall mention only those that relate to plants that are close to Chinese ones. The female *Aristolochia* has a round root; the male a long one.³³³ The long turnip is male; the round one female.³³⁴ The cedar is male;

³²⁹ Sprague (1928, p. 87). ³³⁰ Sprague and Nemes (1928–31, p. 552).

³³¹ This characteristic was also used by Rumphius; see de Wit (1952, p. 108).

³³² Porta (1650, p. 33). English version of French transl. by the author.

³³³ Aristolochiae have bisexual flowers; see Lawrence (1951, p. 473).

³³⁴ Plants of the Crucifer family (Brassicaceae) have bisexual flowers; see Lawrence (1951, p. 520).

the bay tree, cypress and savin are female. The male garden mercury is recognisable from its testicles.³³⁵ The male nettle is stinging; the female possesses no sting.³³⁶ 'According to Dioscorides, the male peony has full leaves resembling those of a walnut tree and several thick, swollen roots; the female peony has leaves divided like those of Alexanders and roots from which seven or eight tubers hang, like those of the asphodel'.³³⁷

(ii) *The Chinese view*

After that brief reminder of the way in which the European botanists from antiquity to the Renaissance viewed those sexual differences both real and supposed, I return now to China to undertake an enquiry based on written sources. I shall try to establish according to what criteria distinctions of sex were made and to what extent those observations led to explanations linked with reproduction. We have already come across a number of claims according to which there were male and female plants and it was the female ones that produced fruits. We shall try to find out whether, behind the genders attributed to plants, there lay notions of plant sexuality. In this respect ancient China provides a domain of investigation that is particularly interesting because a plant of great economic importance, hemp, *da ma* 大麻 (*Cannabis sativa* L.), cultivated without interruption ever since the Neolithic right down to the present day – that is to say, for at least 6,000 years³³⁸ – is, precisely, a dioecious plant. So the ways in which hemp has been named, observed and perceived in the course of Chinese history will provide us with our first marker in this study of sex among plants.

The cultivation of hemp is first mentioned in the *Shi jing* 詩經 (Book of Odes) (c.-1000 and c.-600).³³⁹ The poem *Qi yue* 七月 'Seventh Month',³⁴⁰ which is famous for its description of agricultural activities, twice mentions hemp, using two different terms: 'In the seventh month hemp (*ju* 苴) is harvested' and 'In the tenth month the hemp (*ma* 麻) is taken in'. The first term, *ju*, is glossed as 'hemp seeds' (*ma zi* 麻子), while the second, *ma*, refers to the plant in general or to its textile fibres. So the harvesting takes place in two stages: in the first it is the female plants or just the bunches of fruits that they carry that are harvested; in the second stage all the plants

³³⁵ In this case of a dioecious species, its virile attributes are in fact the fruits, which, of course are borne by female plants.

³³⁶ Porta (1650, p. 36). Here there is a comparison between a true nettle of the *Urtica* genus with stinging leaves, and a plant with leaves that are shaped like those of the nettle but lack the irritating hairs and are certainly a species of *Lamium*. *Lamium album* L. in English is 'white dead-nettle', and in French *ortie blanche* ('white nettle').

³³⁷ Saint-Lager (1884, p. 38). The respective identifications that the author gives for the male plant are *Paeonia peregrina* and *P. officinalis*, and for the female *P. corallina*.

³³⁸ Li Hui-Lin (1974, p. 437). ³³⁹ Loewe (1993, p. 415).

³⁴⁰ This poem appears in the first part of the *Shi jing*, 'Kuo feng' (Airs from the States), in the subsection 'Bin feng' (Airs of the State of Bin). The state of Bin corresponds to a zone that nowadays includes the towns of Xun-yi and Binzhou in the western centre of the Shaanxi province. These poems were probably composed during the Western Zhou dynasty (-1066–-770). See Xiang Xi (1986, p. 24). The poem can be found in Couvreur (1896, pp. 160–5), Legge (1991, pp. 226–33).

left in the field are lifted.³⁴¹ The fact that, in three other poems,³⁴² hemp (*ma*) is always associated with evocations of meetings between boys and girls leads Xia Weiying to conclude that the mention of hemp in the poems is an allusion to the relations between men and women.³⁴³ Continuing this line of reasoning in connection with the poem 'The Mountain of the South' (*Nan shan*, in the subsection Qi Feng 齊風 (Airs from the State of Qi)),³⁴⁴ in which 'cultivating hemp is compared to taking a wife', he wonders whether this comparison 'might reflect the fact that people were aware that there was a distinction between female and male hemp plants'. The hypothesis is attractive but not altogether convincing since other, non-dioecious, plants are also evoked in the same context: barley and wheat and plum trees in the poem 'On the Hill There Is Hemp', china-grass and imperata in the poem 'The Pool at the Eastern Gate'. All the same, it seems quite likely that a clear distinction was made between hemp plants with seeds and those without.

In the first chapter of the *Shang shu* 尚書 (Book of Documents),³⁴⁵ Yu Gong (Tribute of Yu) mentions hemp (*xi* 枲), among other products offered as tribute to the emperor by the Qing province. In another pre-Qin text,³⁴⁶ the chapter 'Sang fu' 喪服 (Mourning Attire) in the *Yi li* 儀禮 (Rites), the principal text mentions a band of hemp (*ju* 苧).³⁴⁷ The commentary that accompanies it – which seems to be contemporary³⁴⁸ – explains that *ju* is hemp (*ma*) that has fruits (*fen* 蕢). A little further on, the text mentions a band of male hemp, *mu ma* 牡麻, and the commentary explains that *mu ma* is *xi ma* 牡麻者枲麻也, *xi* hemp.³⁴⁹ This is probably the first explicit mention testifying clearly to the distinction between the two hems, the one that produces seeds and another, male, one. Simply by deduction, one may take the former kind to be implicitly 'female', even though the text does not emphasise this sexual opposition.

The first book of the *Zhou li* 周禮, the Rites of Chou,³⁵⁰ describes the duties of the personnel dependent on the 'Heavenly Offices', those of the Prime Minister, and mentions a 'Director of the Male Hemp', *Dian xi* 典枲, who is in charge of all types of textile made from hemp.³⁵¹ This suggests that it was for its textile fibres that the male hemp was cultivated, while the seeds of the female hemp, hemp seed, fell into the category of edible grains, *gu* 穀.³⁵²

³⁴¹ At this point it should be noted that in all the consulted contemporary manuals on the cultivation of hemp, the opposite is described. The male plants are pulled up as soon as the pollen has dispersed, which clearly happens before the fruit form on the female plants.

³⁴² Ts'i Fong, *Nan Chan* (Qi Feng, Nan Shan) (the Southern Mountain), in Couvreur (1896, p. 107–8), Legge (1991, pp. 155–7). Wang Fong, *K'iou Tchoung lou Ma* (Wang Feng, Qiu Zhong You Ma) (On the Hill There Is Hemp), in Couvreur (1896, p. 84), Legge (1991, pp. 122–3). Tch'enn Fong, *Toung Menn Tcheu* (Chen Feng, Dong Men Zhi Chi) (The Pool at the Eastern Gate), in Couvreur (1896, pp. 147–8); Legge (1991, pp. 208–9).

³⁴³ Xia Weiying (1988, p. 66). ³⁴⁴ Couvreur (1896, pp. 107–8), Legge (1991, 155–7).

³⁴⁵ Also named *Shu jing* 書經. This text was composed 'in the last years of the Chou dynasty ... perhaps as late as the Ch'in dynasty'; see Shaughnessy (1993, p. 378). See French translation in Couvreur (1935, pp. 61–89), Legge (1991, pp. 93–151). For a description and analysis of this text, see also SCC Volume 6, Part 1, pp. 82–103.

³⁴⁶ See Boltz (1993b, pp. 237–8). ³⁴⁷ See French translation in Couvreur (1916, p. 384).

³⁴⁸ Boltz (1993b, p. 236). ³⁴⁹ Couvreur (1916, p. 391). See also Li Changnian (1962, p. 76).

³⁵⁰ The text is dated to the 2nd century BC; see Boltz (1993a, p. 26). ³⁵¹ See Lin Yin (1985, p. 80).

³⁵² See, for example, Qi Sihe (1949, p. 298).

In the *Er ya*, the entry *zi xu* 苧 is defined as 'the mother of hemp', *ma mu* 麻母, and this term is accompanied by a commentary by Guo Pu, who explains that 'this is *ju*, the hemp that produces seeds' (*ju ma cheng zi zhe* 苧麻盛子者).³⁵³

As for the cultivation methods, the *Fan Shengzhi shu* 汜勝之書³⁵⁴ (1st century) distinguishes between 'cultivating hemp' (*zhong ma* 種麻) and 'cultivating male hemp' (*zhong xi* 種臬). Was it a matter of encouraging the growth, in the same field, of female plants in the first case and male plants in the second case? Or was it, on the contrary, a matter of growing female plants exclusively in the first case and males in the second? If the latter was the correct supposition, even if none of the extant passages from this text mention any process of selection in the sowing, the implication would be that the cultivators had elaborated empirical means that enabled them to recognise the seeds that needed to be sown in order to harvest either hemp seed or, on the contrary, male plants, the stems of which would be steeped to produce fibres. There is a 2nd-century text that would suggest the latter. The *Si min yue ling* 四民月令 (Monthly Ordinances for the Four Sorts of People [Scholars, Farmers, Artisans and Merchants]) (c.+160) by Cui Shi 崔寔 gives a comparative description of seeds that produce male hemp seedlings and those that produce female seedlings: '[Seeds] of male hemp, greenish, not full, pointed at both ends, light and floating [on water]'.³⁵⁵ 'Seeds of female hemp, black, full and heavy, they can be pressed to make candles. They do not produce male hemp'.³⁵⁶ Later, Jia Sixie 賈思勰, who cites those two sentences in notes in the *Qi min yao shu* 齊民要書術 (Essential Techniques for the Peasantry) (c.+535), also repeats more of the text: 'To cultivate [male] hemp, use white seeds',³⁵⁷ and 'Those who wish only to obtain seeds, sow seeds with black spots'.³⁵⁸ One suspects that this advice is theoretical, for all consulted contemporary authors agree that it is not possible to tell from the seeds which will be the sex of the seedlings that they will produce. For example,

The seeds which are grown on the same stock produce male and female plants indiscriminately, and the difference cannot be known until the plants are somewhat advanced in growth. When the seed is put into the ground it is therefore quite uncertain what proportion there will be of each; yet here too we have occasion to mark the admirable arrangement of nature, for the due proportion of each generally make their appearance.³⁵⁹

A contemporary treatise on agricultural botany confirms that, after sowing, 'the resultant crop consists of about an equal number of male and female plants'.³⁶⁰ Did

³⁵³ Bretschneider (1893, no 140).

³⁵⁴ The version known today was established by Ma Guohan (1996, *juan* 69). The text and an English translation may be found in Shih Shêng-han (1982). See p. 22 of this edition for the passage on hemp.

³⁵⁵ My interpretation of this passage differs from that of Shi Shenghan (1957, p. 93) but is justified by the parallelism of the two statements.

³⁵⁶ It is interesting to compare this to what a French agronomist, Gustave Heuzé (1860, Volume 2, p. 67), wrote in his 'Lectures on Practical Agriculture': 'The good seeds of hemp are grey, with black stripes, heavy, smooth and shiny. The brown or whitish seeds that are light and with pale marbling germinate only with difficulty'.

³⁵⁷ Shi Shenghan (1957, p. 89), Mou Qiyu (1982, p. 86).

³⁵⁸ Shi Shenghan (1957, p. 95), Mou Qiyu (1982, p. 90).

³⁵⁹ Rhind (1872, p. 414).

³⁶⁰ Gill and Vear (1969, p. 204).

the selection indicated by the Chinese texts perhaps modify³⁶¹ this natural balance? In any case, the presence of male plants in the fields of female plants is attested by the agricultural advice to be found in the *Qi min yao shu* itself: 'when they liberate the dust, pull out the males'.³⁶¹ It is clear that the presence of male seedlings is tolerated right up to this crucial moment. Nevertheless, the context does not seem to establish any relationship of cause and effect between this emission of pollen and the formation of seeds. What seems really to be at stake is the influence on the textile quality of the male seedlings. One commentary even explains that 'if one pulls up [the males] before they spread this abundance of dust, the "skin" is not formed, while if one does not pull them up afterwards, it becomes blackish'.³⁶² The text of the *Fan Shengzhi shu* that inspired the author of the *Qi min yao shu* was even more explicit: '[When] the ear is in a powdery exuberance, pull up the hemp'.³⁶³ Although the recommendations of the *Qi min yao shu* certainly testify to careful observation of the physiology of the hemp, they do not suggest that the authors of these texts perceived any cause-and-effect relationship between an abundance of pollen on the male seedlings and the formation of seeds on the female seedlings. It is only in the chapter devoted to the cultivation of hemp for its fibres that such details are noted, whereas no allusion to this is made in the following chapter, which is devoted to the production of seeds. I am not convinced that the observations of Jia Sixie 'may fairly be interpreted as indicating that he recognised sex here, since he seems to have meant that the presence of the male plants was necessary to ensure seed production'.³⁶⁴ I will stop short of that interpretation of the texts in question, preferring, given the absence of any other explanation, to avoid concluding, for example, that the ancient Chinese 'already possessed profound knowledge of the processes of pollination and fertilisation among dioecious plants'.³⁶⁵ Actually, one comparison does come to mind: the way that Theophrastus explains the caprification of fig trees and the artificial fertilisation of date trees. In both cases he recognises that 'the male collaborates with the females, since the tree that bears the fruits is called female. But the process consists here [in the case of the palm trees] of a kind of coupling, whereas it happens there [for the fig trees] in a totally different manner'.³⁶⁶ The two procedures are presented as a means of averting the loss of fruits before they ripen. 'While, on the matter of the fertilisation of the palm tree, Theophrastus may have had an inkling of plant sexuality, the role of the "male" fig tree was, for him, limited to providing insects the sting of which stimulates the ripening of

³⁶¹ Here, too, note that this practice, borrowed by Jia Sixie from the *Fan Shengzhi shu* (Shi Shenghan 1957, p. 91; Mou Qiyu 1982, p. 87) existed in 19th-century France. 'When the pollen falls in great abundance, one starts harvesting the male plants', states a treatise on the cultivation of industrial plants (Heuzé 1860, p. 73).

³⁶² *Wei bo zhe shou pi bu cheng; fang bo pu shou er ji li* 未勃者收皮不成; 放勃不收而即驪 (Shi Shenghan 1957, p. 91; Mou Qiyu 1982, p. 87).

³⁶³ *Fan Shengzhi shu*, j. Shang, 9a, in Ma Guohan (1996, *juan* 69); Shi Shenghan (1957, p. 91); Mou Qiyu (1982, p. 87).

³⁶⁴ Agnes Arber, in a letter dated 4 April 1949, to Joseph Needham (NRI). ³⁶⁵ Shi Shenghan (1957, p. 96).

³⁶⁶ Theophrastus (1988, p. 66). English version of French translation by Amigues.

fruits'.³⁶⁷ As far as both Jia Sixie and Theophrastus are concerned, 'we must believe the evidence: admitting facts and even using them is one thing; but what they mean is quite another. And there is no evidence to show that they grasped this'. To justify that statement, let us return to the terms used by Jules Leroy when he cites the example of Tournefort, who never did recognise plant sexuality:

The great botanist was perfectly well aware of the structure of flowers; he knew better than anyone of the existence of 'separate sexes' and what Theophrastus said about the male and female palm trees . . . yet, despite everything, when it came to dioecious plants, he asked himself: 'Are the corpuscles that escape from the flowers carried on to the young fruits growing some way away in order to stimulate them to keep on growing, as if upon awakening from sleep?'³⁶⁸

We should also note that in various passages of the Chinese texts cited, although there are mentions of 'male' plants (*mu* 牡, *xiong* 雄), the adjective 'female' never appears, the sex of a female plant being implicitly conveyed by the fact that it produces the seeds. This confirms one of the fundamental elements implied in the history of the discovery of plant sexuality, to which Jacob Lorch draws attention, namely 'the preoccupation with fruits rather than with flowers, a very sensible approach indeed, which persisted until well into the eighteenth century'.³⁶⁹

(iii) *The case of hemp*

The male flowers of hemp had attracted attention ever since antiquity certainly because of the abundance of pollen that they liberate. The text of the *Shen nong ben cao jing* (? Western Han)³⁷⁰ mentions hemp in the entry *ma fen* 麻蕒, giving as its synonym *ma bo* 麻勃, but without any further details. Under this entry there is also a mention of *ma zi* 麻子, 'the seeds of hemp'. The text of the *Ming yi bie lu* (? 3rd century)³⁷¹ completes this point by explaining that '*ma bo* is what is very abundant on the flowers of hemp'.³⁷² This is clearly pollen, for the context even indicates that only the flowers on the male plants are concerned here. It would obviously be very interesting to know what the ancient Chinese noticed at the moment of flowering on the female plants. However, when, in the *Ben cao tu jing* 本草圖經 (+1061), compiled under the direction of Su Song 蘇頌 (+1020–1101), we find a mention of 'female hemp', *ci ma* 雌麻, it is only used to designate what to sow in order to have a fine crop of new seeds: 'one chooses among the seeds those that are spotted and that are

³⁶⁷ Note by Suzanne Amigues, the French translator of Theophrastus (see Theophrastus 1988, p. 143).

³⁶⁸ Leroy (1960, pp. 8–9). ³⁶⁹ Lorch (1966, p. 212).

³⁷⁰ The dating of the text poses a problem since 'although it is unmistakably a Han work, it is not mentioned by name in any bibliography or other text of that period' (SCC Volume 6, Part 1, p. 243). Another source (anon. 1981, p. 197) suggests that the book was completed under the Qin or the Han, or even, in the opinion of some commentators, in the Warring States period.

³⁷¹ On the problems of dating this text, see SCC Volume 6, Part 1, p. 249.

³⁷² *Ma bo ci ma shang bo bo zhe* 麻勃此麻花上勃勃者. Cited in the *Zheng lei ben cao*, juan 24, in Tang Shenwei (1957, p. 482).

called “female hemp”; it is said that using these produces an abundant crop of seeds. The others are not suitable.³⁷³ However, the adjective ‘female’ was also attributed to the plant itself, as is attested by a passage in the collection of notes entitled *Tang yu lin* 唐語林, by Wang Dang 王讜 (active at the beginning of the 12th century). This tells us that ‘the male hemp (*xiong ma* 雄麻) has flowers whereas the female (*ci zhe* 雌者) bears fruit. If one wishes to know the females and the males of the hemp, that is how to distinguish them’.³⁷⁴ This last remark is particularly interesting if we recall the methods that we have noted were recommended for picking out the seeds the germination of which would produce female seedlings or male seedlings. Like modern cultivators, the Chinese cultivators of the 12th century had lost those practices, if indeed they ever were operational, and were obliged to wait for the formation of the inflorescences in order to distinguish the male and the female plants.

Now we must consider a term the meaning of which was not clear to most of the ancient commentators, who often interpret it quite differently. The term is *fen* 蕢. In the *Erya* (–3rd century), the entry *fen* 蕢 is in the trees section and, according to Guo Pu’s commentary, it means ‘a tree’s abundant crop of fruits’.³⁷⁵ A homophone with a different graph,³⁷⁶ 𦵏, appears in the chapter relating to grasses. It is glossed *xi shi* 枲實 (the fruiting of *xi*), with a synonym *xi ma* 枲麻, whereas Guo Pu’s commentary indicates that hemp (*ju* 苧) has *fen* 𦵏, 苧麻有𦵏. So in this context male and female hemp both bear fruit.³⁷⁷ In the *Shen nong ben cao jing*, as we have seen, *ma fen* = *ma bo* (pollen). On this subject, Su Song remarks³⁷⁸ that

the [*Shen nong*] *Ben [cao] jing* gives similar indications for *ma fen* and *ma zi*, but the hemp flower (*ma hua*) is not something that one eats . . . Furthermore, the red characters of the *Ben cao jing*

³⁷³ Cited in *juan 24* of the *Zheng lei ben cao* in Tang Shenwei (1957, p. 483).

³⁷⁴ *Juan 8*, 19a.

³⁷⁵ Bretschneider (1893, no 298).

³⁷⁶ Bretschneider (1893, no 104).

³⁷⁷ Attribution of the male sex to the plant that produces the seeds is not limited to China. For example, *La nouvelle maison rustique* (The New Rustic House) (Liger 1777, Volume 1), a work familiar throughout the French countryside, contains the following remarks: ‘There is male hemp and female hemp: and unlike other living beings, it is the male that carries the seed, not the female. As a result, the female hemp is valued more highly than the male, on account of the delicacy of the thread that it produces. The male produces from its stem a greater quantity of branches; and from its trunk or pipe, charcoal smut is produced and is used in the composition of canon powder. The female has thinner stems and almost no branches; it only has leaves and no seeds at all: the leaves of the male are larger and darker than those of the female & they grow six by six from a single stem; their root is very hairy. The female that never bears seeds nevertheless does produce flowers; & the male never flowers, although it produces seed’ (ibid., p. 506). ‘It is gathered in two stages: the female hemp in July and the male hemp at the end of August. At first one pulls up only the female hemp, which is the one with the slimmer stem & no seed, because the less time it remains on the earth, the sweeter it is’ (ibid., p. 508). One paragraph further on, one is therefore amazed to read the following: ‘The stem of the male hemp is at first taller, so that the dust that falls from the flowers that the male alone bears can be received by the bunches of seeds that are carried by the female, which is much shorter. That is how the species perpetuates itself; & once that function is completed, the male stems dry up & they are pulled up, while the stems with seeds are all still green; these continue to shoot up and to thicken until the plant and the seed have reached perfection; & that is the reason why the male hemp is never so soft and so valued for fabrics as its female is’ (ibid., p. 508). No doubt the anonymous author of this eleventh, revised, edition of a work based on a 1645 text has added this passage, which is in line with what botanists had discovered about plant sexuality, but he did not bother to revise the whole chapter, hence a contradictory text that reflects the fluctuations of knowledge that wavered between popular belief and scientific knowledge.

³⁷⁸ Cited in *juan 24* of the *Zheng lei ben cao* in Tang Shenwei (1957, p. 483).

ji zhu]³⁷⁹ indicate that *ma fen* has a spicy taste, *ma zi* a sweet taste, so it seems that these are two different things ... So are *fen*, *zi* [seed] and *hua* [flower] really three different things?

This passage reappears in the *Ben cao pin hui jing yao* (a manuscript completed in 1505) compiled under the direction of Liu Wentai.³⁸⁰ Part of the reflection that follows the passage, in an attempt to reply to that question, is particularly interesting for our present discussion. It reads as follows: 'Clearly, that which flowers has no fruits, that which has fruits produces no flowers. It is as if there was male and female,³⁸¹ which is why two kinds are distinguished'.³⁸² Li Shizhen also repeats Su Song's passage in the *Ben cao gang mu*,³⁸³ before giving his own explanation for the problem: 'Hemp (*da ma* 大麻) is today called *huo ma* 火麻 or *huang ma* 黃麻. There is a female and a male.³⁸⁴ The male is called *xi* 梠 and the female *ju* 苴 ... During the fifth and the sixth moons delicate yellow flowers open, which form ears and later on fruits'. Re-examining a number of passages in a critical way, he concludes by wondering if it is not possible to resolve the question posed by Su Song about three distinct things. He bases his reasoning on the *materia medica* of Wu Pu 吳普,³⁸⁵ the *Wu pu ben cao* 吳普本草 (c.+225), citing him as follows:

ma bo 麻勃, synonym *ma hua* 麻花 [hemp flower], spicy taste, non-toxic. *Ma lan* 馬籃, synonyms *ma fen* 麻蕒, *qing ge* 青葛, mild spicy taste, toxic. The leaves of hemp are toxic, eating them causes death. The kernel contained in the hemp seeds is not toxic but, if it is at first kept in the soil, when eaten it causes death.

Then he goes on, 'according to these statements, *ma bo* is the flower, *ma fen* is the fruit and *ma ren* 麻仁 is the kernel inside the fruit. Wu was a man of the Three Kingdoms [period], close to antiquity, and his analysis is most enlightening'.

After this, under the entry *da ma* 大麻 (hemp),³⁸⁶ Li Shizhen opens up three sub-rubrics, *ma bo*, hemp flower; *ma fen*, which he defines as 'fruit with its shell';³⁸⁷ and *ma ren*, hemp kernel. In this way he establishes a clear distinction between male plants and female ones, which corresponds to the botanical reality, and at the same time he resolves a lexicological and pharmacological problem with potentially grave consequences. On the other hand, he is not at all interested in the mechanisms of the production of seeds.

³⁷⁹ This is a reference to a work by Tao Hongjing, *Ben cao jing ji zhu*, in which the original text of the *Shen nong ben cao jing* was written in red characters, while later additions were in black characters. In works on *materia medica* that were published later, the red characters were replaced by white ones that appeared in panels with a black background. See SCC Volume 6, Part 1, p. 251.

³⁸⁰ See pp. 66–74 above. ³⁸¹ *Si you mu pin* 似有牡牝. ³⁸² Liu Wentai (1982, p. 814).

³⁸³ Li Shizhen (1975–81, Volume 3, p. 1444). ³⁸⁴ *You ci you xiong* 有雌有雄.

³⁸⁵ Wu Pu, a disciple of the famous doctor Hua Tuo (?–208), must have been very familiar with hemp, the narcotic properties of which his master relied on when preparing patients for surgery.

³⁸⁶ *Cannabis sativa* L.

³⁸⁷ It seems likely that the toxic and anodine properties of the resin contained in this 'shell', *ke* 殼 (Li Hui-Lin 1975, p. 56), had been recognised by a doctor such as Hua Tuo. This would justify the existence of two different terms to denote the uncovered, edible and eaten seed on the one hand and, on the other, the enclosed, medicinal seed.

In texts later than the *Ben cao gang mu* – both encyclopaedic³⁸⁸ and horticultural like the *Er ru ting qun fang pu* (between 1621 and 1628) by Wang Xiangjin and its prolongation, the *Guang qun fang pu* (1708),³⁸⁸ and also more botanical works, such as the *Zhi wu ming shi tu kao* (1848) by Wu Qijun – there are no original remarks attesting any new observations or any attempts at explanation that would complement the knowledge formalised by Li Shizhen. As in Europe, it seems, recognition of a distinction between male and female plants is not accompanied by any recognition of a particular plant sexuality, except perhaps in the *Ben cao pin hui jing yao*, as we have just noted above. What is more, the relation of causality between the release of pollen and the production of fruit, which is correctly noted in the *Fan Shengzhi shu*, then by Cui Shi in the 3rd century and, finally, picked up by Jia Sixie two centuries later, is no longer even mentioned in the later writings. In Li Shizhen (1596), repeated by Xu Guangqi in the *Nong zheng quan shu* (1639), one reads, ‘the male is named *xi, mu ma* 牡麻 [male hemp], the female is named *ju* . . . Between the fifth and the sixth moon delicate yellow flowers open, and the formation of fruit follows’, which is all part of the natural and immutable process described by Wang Fuzhi, which was cited at the end of the preceding chapter.

An analogous remark may be made about another dioecious plant, belonging to the botanical family of the Moraceae and, like hemp, also of considerable economic and cultural importance in China: the mulberry tree.³⁸⁹ The text of the *Er ya* states that ‘half the mulberry trees have mulberries . . . those are the women-mulberry trees (*nü sang* 女桑)’. Guo Pu’s commentary describes the latter as ‘small mulberry trees with long branches’. The text of the *Er ya* seems to indicate that the mulberry trees that have no fruit are named *zhi* 梔, a term today used exclusively for the gardenia.³⁹⁰ Later, in the abundant literature devoted to mulberry trees, except for the repetition of the citation from the *Er ya*, I have found no mention attesting to the recognition of sexual differences. On the other hand, if we turn to consider the mulberry tree used for paper, *zhu* 楮,³⁹¹ the attitude is noticeably different. Li Shizhen³⁹² writes,

According to what Xu Shen says in the *Shuo wen* [jie zi], *zhu* 楮 and *gu* 穀 are but one of a kind, they should not be separated, the only distinction to be made is that between female and male. The males have a speckled cortex and undivided leaves; in the third month they flower in the form of long ears like the flowers of willows that do not produce fruits; in years of famine, those flowers are gathered and eaten. The females have a white cortex and ramified leaves,³⁹³ they produce ‘broken’ flowers³⁹⁴ and fruits³⁹⁵ resembling the Chinese arbutus . . .

³⁸⁸ For a description of these texts, see pp. 25–30 above. ³⁸⁹ *Morus alba* L. ³⁹⁰ *Gardenia augusta* Merr.

³⁹¹ *Broussonetia papyrifera* L’Her. ³⁹² Li Shizhen (1975–81, Volume 3, p. 2074).

³⁹³ This contrast between simple and composite leaves expresses the fact that there is a great diversity in the forms of leaves on heterophyllous plants such as a paper mulberry tree, whether male or female.

³⁹⁴ The term *sui hua* 碎花, ‘broken flower’, is generally used to designate the composite inflorescences of umbellifers. Here it is applied to other composite inflorescences, capitulas that form many protruding heads.

³⁹⁵ These are the fruits of *yang mei*, *Myrica rubra* Sieb. et Zucc.



Fig. 115. Paper mulberry. On the right side of the illustration one can see female flowers with a single pistil, and to the left a male flower with four stamens. From anon. (1972-6, Volume 1, p. 481).

In this particular case, female and male plants are clearly recognised, which certainly corresponds to botanical reality (Fig. 115). However, even if the author does recognise the presence of flowers also on female plants, nothing in the text alludes to the mode of fertilisation.

From the remarks that Chinese texts have provided concerning the differentiation between female and male hemp and mulberry plants, it is possible to pick out certain elements that will constitute paths to follow in the rest of this enquiry. The first way of distinguishing between male and female plants is to give them different names, at the same time indicating that they belong to the same group. Thus for hemp, *ma*, what carries the seeds is *ju* while the male is *xi*; in the case of the mulberry tree, *sang* 桑, the fruit bearer is *nü sang* 女桑 or *yi sang* 楝桑 and, according to the *Er ya*, the other plant is *zhi* 柎. Another way is expressly to designate the plant that bears the fruit as 'mother', *mu* 母, or 'woman', *nü* 女. In this case the adjective 'male', *mu* 牡, may be attributed to the plant that does not bear any fruit. Later on, right at the beginning of the 16th century, female, *pin* 牝, was set in opposition to male, *mu* 牡, two terms that primarily refer to animals. Finally, certain authors, including Li Shizhen, also clearly refer to female, *ci* 雌, and male, *xiong* 雄.

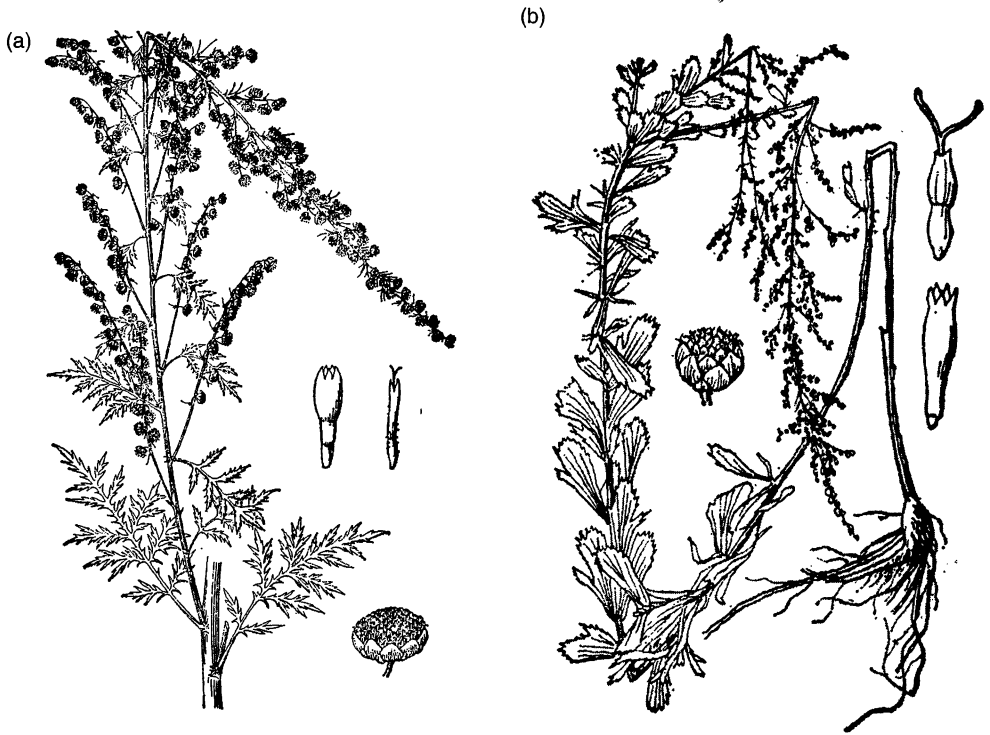


Fig. 116. Two wormwoods mentioned in *Er ya*: (a) hao 蒿 (*Er ya tu, juan xia qian, shi cao*, 爾雅圖, 卷下前, 釋草2b) *Artemisia canifolia* Buch.-Ham. ex Roxb. (Bretschneider, 1893, p. 28, no 13); and (b) wei 蔚 (Ibid.), *Artemisia japonica* Thunb. (Bretschneider, 1893, pp. 28–9, no 14).

(iv) Other sexualised grasses

The number of plant names that satisfy the criteria that we have just mentioned is not great. The *Er ya* provides a few examples of plants designated male, *mu* 牡. Thus the plant named *wei* 蔚 is defined as *mu-shen* 牡菝, 'male *shen*'.³⁹⁶ Guo Pu's commentary explains that it 'has no seeds'. *Shen* 菝 is identified by a synonym, *hao* 蒿³⁹⁷ (Fig. 116a). In the *Er ya zhu shu* 爾雅注疏, 'Explanations of the commentaries on the *Er ya*' (c. +1000), Xing Bing 邢昺 explains that the distinctive features of these two plants are their colour and the presence or absence of seeds.³⁹⁸ He also states that the *shen* is the male of the *hao*,³⁹⁹ yet he then cites the commentary by Lu Ji that explains that the male artemisia, *mu hao* 牡蒿, begins to grow in the third moon, flowers in the seventh and, in the eighth, produces long pointed pods.⁴⁰⁰ *Wei* 蔚 appears in poem 202 in the *Xiao Ya* in the *Shi jing*,⁴⁰¹ in which a son, in the service

³⁹⁶ Bretschneider (1893, no 14).

³⁹⁷ Bretschneider (1893, no 13).

³⁹⁸ Cf *Er ya zhu shu, juan 8, 13a*.

³⁹⁹ *Hao zhi xiong* 蒿之雄. *Er ya zhu shu, juan 8, 13a*.

⁴⁰⁰ Literally 'horns', *jiao* 角. On the botanic terminology, see pp. 120–9, 177–81 above.

⁴⁰¹ Xiang Xi (1986, pp. 820–1), Couvreur (1896, pp. 261–3).

of a prince, laments not having been able to take care of his parents before their death. He compares himself to this plant, 'an artemisia of the most wretched kind' – as Séraphin Couvreur translates it, in French, *une armoise des plus viles* – as opposed to the *e* 莪 artemisia 'which grows tall and wide'. The *wei* 蔚 artemisia is identified as *Artemisia japonica* Thunb. (Fig. 116b).⁴⁰² The commentary by Guo Pu on the entry *e* 莪 in the *Er ya* indicates that this term is synonymous with *e hao* 莪蒿.⁴⁰³ In fact, though, from a botanical point of view it is not an artemisia but a plant with the same habit and of comparable size, a crucifer, *Descurainia sophia* (L.) Webb. ex Prantl.⁴⁰⁴ A *mu mao* 牡茅, 'male imperata', is also mentioned,⁴⁰⁵ a kind of *bai mao* 白茅,⁴⁰⁶ according to Guo Pu's commentary.

Here, now, are some plants the sex of which is clearly stated not by the name but in descriptions. At the entry *tang* 棠, a term designating a pear tree,⁴⁰⁷ the *Shuo wen jie zi* distinguishes between the male, *mu* 牡, named *tang* and the female, *pin* 牝, named *du* 杜.⁴⁰⁸ The differences between the two are explained in the *Er ya*: 'the *du* is a *gan tang* 甘棠 [sweet *tang*]'⁴⁰⁹ and 'it is a *chi tang* 赤棠 [red *tang*]', while the white one is *tang*'.⁴¹⁰ A commentary by Lu Ji (+261–+303) repeats these definitions and completes them:

The *gan tang* is called *du li* 杜梨 or *chi tang* [red *tang*]. There are two sorts of *tang*, the white is a good fruit and is also called *gan tang* or sweet *tang*. It is of a pleasant sourish taste and mucilaginous, whilst the fruit of the red *tang* is harsh and acid. There is a proverb saying 'harsh as a *du*'. But the wood of the red *tang* is tough and fit for making bows.⁴¹¹

Lu Ji seems to be confused, for he calls both *tang* sweet. Li Shizhen creates a new entry in the *Ben cao gang mu*, *tang li* 棠梨, in which he repeats the citations from the *Er ya* but in an indicative way only. In his explanations, he no longer speaks of male and female. He identifies *tang li* as a wild pear tree, *ye li* 野梨, abundant in mountain forests, smaller than the cultivated pear tree but excellent for receiving a graft from the latter. He distinguishes between two different kinds that share four characteristics: sweetness, acidity and white or red colour. Relying on Lu Ji, he concludes that 'the white *tang* is the sweet *tang*, with fruits that are agreeably acid and melting. The red *tang* has fruits that are harsh and acid, the veins in its wood are red and it can be used for making bows'.⁴¹² So it would seem that the differences in the colour of the wood and the taste of the fruits may originally have been interpreted as differences in the sexes, as we saw above that Giambattista della Porta did in his *Phytognomonica*.

Writing about a Amaranthacea, *niu xi* 牛膝,⁴¹³ a grass mentioned in the *Shen nong ben cao jing* and classified in the upper rank, Tao Hongjing writes, 'its stem is knotted. The one that has a violet stem and large knots is male (*xiong*), the one with a dark green stem and tiny knots is female (*ci*); the males are the best ones'. Tao Hongjing's

⁴⁰² Lu Wenyu (1957, p. 105). ⁴⁰³ Bretschneider (1893, no 44). ⁴⁰⁴ Cf Gao Minggan (2006, p. 267).
⁴⁰⁵ BS 2/183. ⁴⁰⁶ *Imperata cylindrica* (L.) P. Beauv. (anon. 1977b, Fig. 1434). ⁴⁰⁷ *Pyrus betulafolia* Bge.
⁴⁰⁸ Ding Fubao (1928, p. 2382). ⁴⁰⁹ Bretschneider (1893, no 242). ⁴¹⁰ Bretschneider (1893, no 254).
⁴¹¹ Bretschneider (1893, no 482). ⁴¹² Li Shizhen (1975–81, p. 1767).
⁴¹³ *Achyranthes bidentata* Bl. (anon. 1977b, Fig. 0833).

opinion, which is cited by Li Shizhen,⁴¹⁴ is repeated by Wu Qijun in the *Zhi wu ming shi tu kao chang bian* (1848),⁴¹⁵ which attributes it to the *Ben cao tu jing* (+1061) by Su Song. However, in the *Ben cao yuan shi* (1612), Li Zhongli considers that the male has a thick, long root that is pliant and rectilinear, while the female plant has a slender, strongly ramified root. Note that in this case, too, where the species is not dioecious, the distinction between male and female corresponds to differences of colour and morphology, with an added supposed difference in therapeutic efficacy between different plant species, the second one being possibly either *Cyatula tomentosa* (Roth.) Moq., today known as *chuan niu xi* 川牛膝, or *Achyranthes longifolia* Makino, *liu ye niu xi* 柳葉牛膝.⁴¹⁶

Still in the *Shen nong ben cao*, among the medium-rank drugs, the rhizome of a grass is called *zi shen* 紫參 (violet *shen*), a term that has as a synonym *mu meng* 牡蒙 (male *meng*). Two identifications of the plant that has this rhizome are possible. On the one hand, *zi shen* 紫參 today designates a sage, the ‘Chinese sage’.⁴¹⁷ However, the importance of the root as *materia medica* inclines one to follow the choice of Bretschneider, which is confirmed by a contemporary synonym, *quan shen* 拳參,⁴¹⁸ and which favours the *Polygonum bistorta* L., a Polygonacea. As for *meng* 蒙, it is possible to deduce from various synonyms in three entries of the *Er ya* that this term designates a *Cuscuta*,⁴¹⁹ the bistort variety of which would thus be the ‘male’ (Fig. 117a, b). Another ‘male’ plant, classified among the middle-rank drugs but also well known for its ornamental quality, is the *mu dan* 牡丹, ‘male cinnabar’ or tree peony.⁴²⁰ According to the *Ben cao tu jing* (1061), this flowers and also produces fruits. Up until the end of the 6th century, its status in relation to the herbaceous peony, *shao yao* 芍藥, remained ambiguous, with some people regarding it as a kind of ligneous *shao yao*.⁴²¹ Another drug in the *Shen nong ben cao jing*, of the upper rank, is the ‘male cinnamon’, *mu gui* 牡桂,⁴²² but that might only be the ‘tree cinnamon’, *mu gui* 木桂, according to the *Er ya*.⁴²³

It is in the writings of Su Jing 蘇敬, in the *Xin xiu ben cao* 新修本草 (+659), that for the first time we find a reference to a sexual differentiation in the China-berry tree, *lian* 楝,⁴²⁴ which is said to have bisexual flowers, the fruits of which are mentioned in the *Shen nong ben cao jing* as being lower-rank products. Citing the *Xin xiu ben cao*, the *Zhen lei ben cao* states,⁴²⁵

it is said that there are two kinds: there is a male (*xiong*) and a female (*ci*). The male has a red root and no fruits. It is poisonous and when one takes a lot it provokes unstoppable vomiting

⁴¹⁴ Li Shizhen (1975–81, p. 1027). ⁴¹⁵ Wu Qijun (1959, p. 432). ⁴¹⁶ Anon. (1972–6, Volume 1, p. 608).

⁴¹⁷ *Salvia chinensis* Benth., in anon. (1977b, Fig. 1224).

⁴¹⁸ Bretschneider (1898, no 21, pp. 61–2); anon. (1977, Fig. 4022).

⁴¹⁹ Bretschneider (1893, no 181); anon. (1977b, Fig. 4123). *Cuscuta chinensis* Lam. or *Cuscuta japonica* Choisy.

⁴²⁰ *Paeonia suffruticosa* Andr. ⁴²¹ See SCC Volume 6, Part 1, p. 397.

⁴²² *Cinnamomum cassia* L. (anon. 1977b, Fig. 1790). ⁴²³ Bretschneider (1893, no 247).

⁴²⁴ *Melia azedarach* L. ⁴²⁵ *Zheng lei ben cao*, *juan* 14, in Tang Shenwei (1957, p. 344).

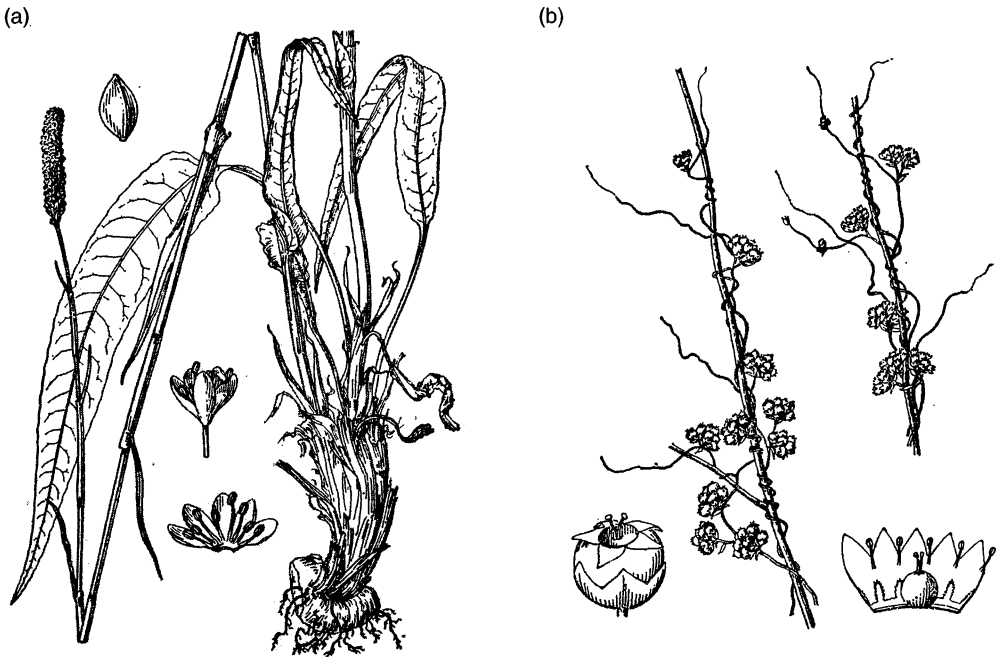


Fig. 117. Bistort: (a) *Polygonum bistorta* L., after anon. (1972–6, Volume 1, p. 555); (b) dodder, *Cuscuta chinensis* Lam., after anon. (1972–6, Volume 3, p. 522), considered respectively as male and female.

which sometimes leads to death. The female has a white root and fruits and is not very toxic. So it is the females that one should use.

Li Shizhen, who cites this same text, does not, in his own remarks about this tree, explicitly confirm its contents.⁴²⁶

The name of the male agnus castus,⁴²⁷ *mu jing* 牡荊, which appears in the pharmacopoeia with the *Ming yi bie lu* (c.+510) among the drugs of the upper rank, poses a problem for Tao Hongjing. He wonders what justifies calling this plant male, given that this shrub bears fruits. A reply to this is given in the *Xin xiu ben cao* (+659).⁴²⁸ It is that in this case the habit, not the presence or absence of fruits, is what is pertinent in defining the plant's sex. It is because its stem is not creeping like that of another species, the creeping agnus castus, *man jing* 蔓荊,⁴²⁹ that this one is described as 'male', *mu*. Presumably, implicitly the species with a creeping stem is therefore 'female' even if no notion of sexuality is attached to this categorisation. In this case, it seems clear that the adjective 'male' is altogether in keeping with the notion of *yang*, one of the attributes of which is rigidity, as opposed to pliancy of *yin*.

⁴²⁶ Li Shizhen (1975–81, p. 2002).

⁴²⁷ *Vitex negundo* L. var. *cannabifolia* (Sieb. et Zucc.) Hand.-Mazz. In anon. (1977b, Fig. 2295).

⁴²⁸ Cf *Zheng lei ben cao*, juan 12, in Tang Shenwei (1957, p. 302).

⁴²⁹ *Vitex rotundifolia* L. or *Vitex trifolia* L. In anon. (1977b, Fig. 5309).

An interesting case of the sexualisation of a plant is, in contrast, supplied by a liana belonging to the Polygonaceae family, *he shou wu* 何首烏,⁴³⁰ a non-dioecious species. It appears in the *materia medica* of the 6th century in a work by Da Ming 大明, alias Ri Huazi 日華子, that has long been lost, the *Da Ming ben cao* 大明本草, also known as *Ri hua zi zhu jia ben cao* 日華子諸家本草 (Master Ri Hua's Pharmacopoeia of All the Schools), the contents of which are partly preserved by the quotations that occur in the *Zheng lei ben cao* by Tang Shenwei. We read that 'this medicinal plant has a female and a male. The male has stems and leaves that are yellow and white, the female ones that are red and yellow'. The text also states that the plant, originally nameless, was called *he shou wu* 何首烏 after the name of the person who discovered it. In a short text that is devoted to him, *He shou wu lu* 何首烏錄 (c.+840), the author, Li Ao 李翱, reports that a monk, called Wen Xiang 文象, on the morning of the eighteenth day of the third month of the eighth year of the Yuan He period (+812), encountered, at the entrance to a cave, an old man who told him how the grandfather of a certain He Shouwu 何首烏, literally 'He with a black head', aged fifty-nine, unmarried, a practising Daoist, returning from a visit to his master in the mountains, had fallen asleep, drunk, in the open air. Upon awakening in the night, he saw in a field two lianas three feet away from each other whose creeping stems entwined for a moment, separated and then entwined again, and repeated this action three or four times. Much intrigued, he took some roots of the plants and questioned the peasants, who did not know what to say. He had the roots dried and one day someone advised him to consume some, seeing that he had no children. After this, he engendered many sons. This person told him the name of the plant, *jiao teng* 交藤, 'liana embrace', and said that eating it caused one to live for 160 years, although 'the prescription was unknown in *materia medica*'. The text also stated that 'there is a female and a male; the male has a stem coloured yellow and white, the female has one that is yellow and red. They grow at some distance from each other and in the night their stems unite'. According to the *Kai Bao [xin xiang ding] ben cao* 開寶[新詳定]本草 (+973), 'there are two kinds, a red one that is male and a white one that is female'.⁴³¹ According to the *Ben cao tu jing* (1061), repeated in the *Zheng lei ben cao*, it is also the colour of the roots that makes it possible to distinguish between the two sexes, the red male and the white female. When preparing medicines, it is best to use both, in equal proportions. Li Shizhen seems to accept the opinions of these various authors, for he does not add his own point of view after the citations and the recipes that he mentions; and he repeats certain crucial points, such as the need to avoid all contact between the roots and iron – they must be cut with a bamboo knife – and the simultaneous use of both red and white roots in medical preparations. In the *Zhi wu ming shi tu kao* 植物名實圖考 (1848) by Wu Qijun 吳其濬, no sexual distinction is made; it simply states that there are 'two kinds, one red and one white'. So it is remarkable to find that two plants of

⁴³⁰ *Polygonum multiflorum* Thunb. In anon. (1977b, Fig. 2310).

⁴³¹ Cited in Wu Qijun (1959, pp. 594–6).

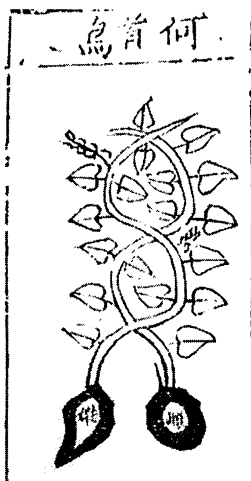


Fig. 118. Supposedly male and female specimens of *he shou wu* (何首烏, *Polygonum multiflorum* Thunb.) entwined, from *Ben cao gang mu* (1596, *fu tu juan zhi shang cao bu man cao lei fu tu* 附圖卷之上, 草部類附圖, 29a). Note the Chinese characters *xiong* 雄, 'male', on the left root and *ci* 雌, 'female', on the right. Cf Li Shizhen (1975–81, Volume 2, *fu tu*, p. 47).

the same species assumed to be of different sexes are attributed human gestures, such as a repeated nocturnal entwining. The image is sufficiently strong to lead to a special graphic representation in pharmacopoeias, showing two plants with their stems very close to each other or intertwined (Fig. 118). That behaviour seems to justify the pharmacological properties of roots which, used together in equal quantities, are said to confer long life and many progeny (mainly male, of course) upon whoever imbibes the concoction.⁴³² Those properties from long ago seem still to be suggested today in, for example, a preparation repeated from the Song and Yuan periods that is called '*he shou wu*, the wine of youth'. Modern compilers who record this recipe do seem, however, to have departed from the sexism of their predecessors, for they specify that this wine 'is good for both men and women, whether they are old or young; after the age of thirty, it is even better for women and, finally, when spouses drink it together it is also very good'.⁴³³ A passage from the compilation of the Southern Song period, *Cai lan za zhi* 採蘭雜誌 (Miscellanies on the Gathering of *Cymbidium*s), cited by Chen Yuanlong 陳源龍 in the *Ge zhi jing yuan* 格致鏡原 (category of trees, strange trees⁴³⁴), is devoted to a *yin shu* 淫樹, 'a lascivious tree':

⁴³² The differences in the colour of the roots indicate two different plants. In contemporary pharmacological practice, red is produced by the polygonum, while the name *bai shou wu*, 'white shou wu', is given to the medicinal roots of various climbing species of the *Cynanchum* genus – in the first place *C. bungei* Decne – which belongs to a different botanic family, the Asclepiadaceae. In general, today the root of the polygonum is not associated with that of *Cynanchum*. See anon. (1977b, Fig. 2310).

⁴³³ Yu Mu (1994, p. 31).

⁴³⁴ *Shu lei, yi shu* 樹類異樹, 'category of trees, strange trees', Chen Yuanlong, *juan* 67, 5b–6a.

Its flowers, which resemble those of shrub peonies, are perfumed.⁴³⁵ There are males and females. For flowers to be produced, it is necessary to plant them beside each other. One can tell the difference between the two sexes by examining the roots, which resemble either a man or a woman. As the flowers open in the morning and close up in the evening, this tree is also called *ye he* 夜合 [closed at night]. It is also called *you qing shu* 有情樹 [sentimental tree]. If one plants it on its own, it does not flower.⁴³⁵

In the case of another plant of medicinal interest,⁴³⁶ an *Ephedra*, *ma huang* 麻黃 (*Ephedra sinica* Stapf.), the *Ben cao tu jing* (1061) records that ‘it is commonly said that there are two kinds, female and male. The female flowers during the third and fourth months and produces fruit during the sixth. The male has no flower and produces no seeds’.⁴³⁷ Li Shizhen repeats this information, adding no commentary.⁴³⁸ It is interesting to note that in the case of a generally dioecious species,⁴³⁹ the absence of seeds has certainly been noticed on the branches of certain plants which, on that account, have been ‘commonly, popularly’, described as ‘males’. Nevertheless, when this phenomenon was transcribed by literati, they seem to have been influenced by a logic of relations of cause and effect, namely that flowers precede fruits, and this led them to mention the absence of flowers on male plants, contrary to what can perfectly well be observed. Li Shizhen writes as follows⁴⁴⁰ on the subject of spinach, which he names *bo leng* 菠薐 or *bo cai* 菠菜: ‘There are male and female. Red broken flowers open from the stem and form agglomerations, not easy to see.’⁴⁴¹ The females give fruits that have thorns and that resemble star-thistle caltrops’.⁴⁴² Li Shizhen seems to have been the first to note that there are distinct male and female plants of spinach – which is in fact a dioecious plant – and that only the female plants produce fruit. Indeed there are no allusions to any sexual distinctions either in the first text that mentions spinach in medical literature, *juan* 29 of the *Zheng lei ben cao*, or in the various horticultural texts that indicate how to cultivate it, whether published before or after the *Ben cao gang mu*.

(v) *The sex of trees*

Bamboos, which are plants, but neither grasses nor trees, as Dai Kaizhi writes,⁴⁴³ will serve as a transition before tackling the case of trees. All the texts that refer to a sexual distinction among bamboos refer to a passage by Su Shi 蘇軾 (Su Dongpo) in the *Dongpo zhi lin* 東坡志林 that states that when there are both female and male bamboos, there are many shoots.⁴⁴⁴ When one plants bamboos, it is therefore

⁴³⁵ For the name *ye he* 夜合, a possible identification is with a species of magnolia, *ye he hua* 夜合花 *Magnolia coco* (Lour.) DC. (= *M. pumila* Andr.). See Fèvre and Métaillé (2005, p. 533).

⁴³⁶ Cf *SCC* Volume 6, Part 1, pp. 239, 241–2.

⁴³⁷ *Zheng lei ben cao*, cf Tang Shengwei (1957, p. 200).

⁴³⁸ Li Shizhen (1975–81, Volume 2, p. 1008).

⁴³⁹ How Foon-chew (1982, p. 178).

⁴⁴⁰ Li Shizhen (1975–81, Volume 3, p. 1645).

⁴⁴¹ *You xiong ci jiu jing kai sui hong hua cong cu bu xian* 有雄雌就莖開碎紅花叢簇不顯.

⁴⁴² *Ji li* 蒺藜, *Tribulus terrestris* L.

⁴⁴³ See p. 4 above.

⁴⁴⁴ See anon. [Su Shi] (1983, p. 268).

necessary to select females. Su Dongpo adds, 'things do not elude *yin-yang*', and he also tells of a way to distinguish the two sexes by looking at the first branch after the top of the root. If there are two branches, it is female; if just one, it is a male. And he stresses in the following remark that 'one can in this way tell that it really is the female plants that produce shoots'. It should be pointed out, though, that the formation of young shoots is not a manifestation of sexual reproduction – from seeds – but corresponds to a phenomenon of vegetative multiplication by tillering at the base of the principal stem.⁴⁴⁵ In this precise case, a projection of human sexuality explains the appearance of young shoots, which suggests the idea of sexed bamboos and even a distinction between morphological characteristics determined by sex.

Citing the *Xin xiu ben cao* (+659), Li Shizhen writes,

the clove tree (*ji she xiang shu* 雞舍香樹)⁴⁴⁶ that has leaves and bark like those of a chestnut tree (*li* 栗), flowers resembling those of a Japanese apricot tree (*mei* 梅), and fruits like the stones of a jujube, is a female tree that is not used for perfume. Although it flowers, the male tree does not produce fruit; its leaves are picked and fermented in order to obtain perfume.

After comparing this note with what is to be found in other works, Li Shizhen concludes that 'the male is *ding xiang* 丁香, the female *ji she* 雞舍'.⁴⁴⁷ Frequently the female is still called *mu ding xiang* 母丁香, 'mother clove'. In other authors, however, the attribution of the adjectives male and female is applied not to the entire plant but only to the parts that are used. Thus Lei Xiao 雷敫⁴⁴⁸ (+5th century) recognises that there are both male and female parts. The males are the small seeds, the females the large ones. It is the females, as large as a jujube stone, that are most used in medicinal preparations. Similarly, Chen Jiamo 陳嘉謨, in the *Ben cao meng quan* 本草蒙筌 (1565), writes on the subject of cloves, *ding xiang* 丁香, that 'there are large ones and small ones, which are distinguished by calling them male and female'. Li Zhongli 李中立, too, in the *Ben cao yuan shi* 本草原始 (1612),⁴⁴⁹ recognises that the male clove that is familiarly called *gong ding xiang* 公丁香, 'father clove', is small and of a frail shape with, at the top, a flower with four petals, whereas the female, which is commonly called *mu ding xiang* 母丁香, 'mother clove', is large and fat, and resembles dogberry (Fig. 119).⁴⁵⁰ These opinions, which are altogether in line with the ideas of Giambattista della Porta, which have been cited above, show that the use of the terms 'male' and 'female' has, for these authors, simply a role for drawing certain distinctions. Incidentally, these adjectives make it possible to differentiate between two products from the same tree, the clove tree with evergreen leaves,⁴⁵¹ of the Myrtaceae family. The 'males', the *ding xiang* cloves, are the floral buds, the 'females' are the fruits, the anthofles, *mu ding xiang* (Fig. 120).

⁴⁴⁵ See McClure (1966, p. 38), for example.

⁴⁴⁶ The first name for a clove in Chinese pharmacopoeia, in the *Ming yi bie lu*.

⁴⁴⁷ Li Shizhen (1975–81, p. 1941).

⁴⁴⁸ Author of the *Lei gong pao zhi lun* 雷公炮炙論.

⁴⁴⁹ *Juan* 4, 25a.

⁴⁵⁰ The fruits of the dogwood tree, *Cornus officinalis* Sieb. et Zucc., *Shan zhu yu* 山茱萸.

⁴⁵¹ *Syzgium aromaticum* (L.) Merr. and Perry (anon. 1977b, Fig. 0026) (= *Eugenia caryophyllata* Tunb., *E. aromatica* Baill., *Caryophyllum aromaticum* L.).

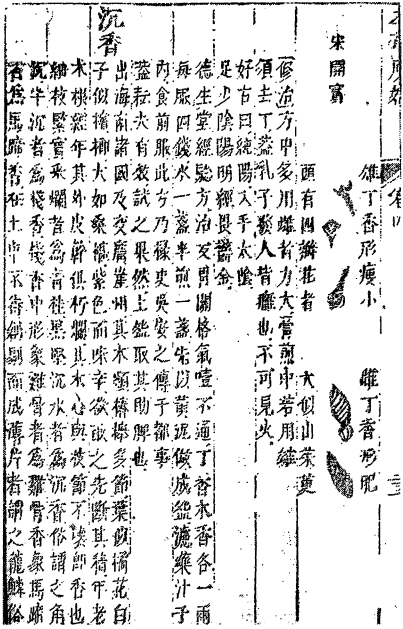


Fig. 119. Cloves: ‘father’ (*gong ding xiang* 公丁香), and ‘mother’ (*mu ding xiang* 母丁香), from *Ben cao yuan shi* (1612, *juan* 4, *mu bu* 木部, 45b). In the caption on the right side of the images one reads that the aspect of the male is thin and small and the aspect of the female is stout.

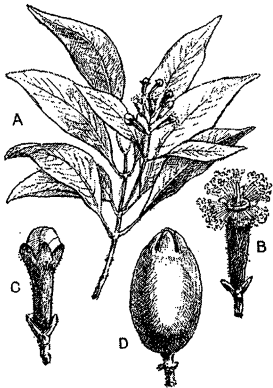


Fig. 120. Clove tree: (a) flowering branch; (b) flower; (c) flower bud, which is the ‘clove’ proper; and (d) fruit, from Capus and Bois (1912, p. 256).

Paradoxically, the ginkgo, ‘a living fossil’ native to China, appears relatively late in Chinese literature.⁴⁵² It is, apparently, in the *You yang za zu* 西陽雜俎

⁴⁵² Li Hui-Lin (1982a, pp. 448–9).

(Miscellanies of the Youyang Mountain) (+863) that Duan Chengshi 段成式 mentions for the first time that

the silver apricot tree (*yin xing shu* 銀杏樹) [the ginkgo], has both female and male; the male has three spines, the female two. Planted together or on the banks of a pool, they can produce fruit and prosper. Perhaps it is through their reflections in the pool that they procreate.

The *Mo ke hui xi* 墨客揮犀 (Fly-Whisk Conversations of a Literary Person) (1080) by Peng Cheng 彭乘 declares that ginkgos that live alone have no fruits, whereas they produce fruit if they are planted in mixed groups. The *Fen men suo sui lu* 分門瑣碎錄,⁴⁵³ (early 12th century) and also the *Nong sang ji yao* 農桑輯要 (1273),⁴⁵⁴ repeat word for word the passage from the *You yang za zu*, whereas the distinction between male and female seeds according to the number of spines is repeated in the *Zhong yi bi yong* 種藝必用 (? second half of the 13th century) by Wu Yi 吳懋. A first attempt to synthesise knowledge relating to the ginkgo with a practical purpose appears in the *Nong shu* 農書 (1313) (Book of Agriculture) by Wang Zhen 王禎. The seventh chapter of the part devoted to cultivated plants 'Bai gu pu ji' 百穀譜集, runs as follows:

These trees have males and females, the females produce fruit. Their fruits are also distinguished as between males and females. When they are sown, they should be sown together; when cultivated close to a pool, the fruits are produced by their reflections.⁴⁵⁵

Finally, the *Zhong shu shu* 種樹書 (Book of Tree-Planting) (late 14th century)⁴⁵⁶ by Yu Zongben 俞宗本 goes on to explain that for the ginkgos to be able to produce fruit, they must be planted together or else at the edge of a pool. Chen Jiamo, the author of the *Ben cao meng quan* (1565), does not mention sexual differences but does provide details about physiology: 'it flowers on the second evening and produces fruit on the third'.⁴⁵⁷ Li Shizhen is probably the author who best sums up the knowledge relating to ginkgos, in *juan* 30 of the *Ben cao gang mu*. He writes as follows:

During the second month the flowers, of a greenish colour, open, squeezed closely together; they open at the second watch⁴⁵⁸ and fall soon after, not many people ever see them.⁴⁵⁹ One branch may produce hundreds of fruits, similar to those of the China-berry;⁴⁶⁰ they moulder under the effect of white frost, one eliminates the flesh and it is the stone that is used as the fruit. These stones are pointed at both ends; those with three spikes are male, those with two are female. The fresh kernel is green in colour; eventually it turns yellow. It is

⁴⁵³ See p. 28a of the manuscript of the Shanghai Municipal Library's *Suo sui lu*, edited by Hu Daojing. See the description in the 'Horticulture and Its Techniques' chapter below, pp. 402–5.

⁴⁵⁴ Cf Shih Shêng-han (1982, p. 179).

⁴⁵⁵ *Zhong shi xu he zhong zhi, li chi er zhong zhao ying cheng shi* 種時須合種之,臨池而種照影成實. Wang Zhen, in Wang Yuhu (1981a, p. 144).

⁴⁵⁶ On the problems of attribution and dating for this important book, see pp. 406–7 below.

⁴⁵⁷ Chen Jiamo (1988, p. 325). ⁴⁵⁸ That is to say, between 21.00 and 23.00.

⁴⁵⁹ Li Shizhen (1975–81, p. 1801). Indeed, it is hard to see the flowers on a ginkgo plant as they are reduced to stamens on male plants and are non-existent on female plants, for the ovaries are naked.

⁴⁶⁰ *Lian*, *Melia azedarach* L. (Jia Zuzhang and Jia Zushan 1955, Fig. 886).

necessary to sow the males and females together, the trees only bear fruit if they are together; it is also possible to put a female tree close to water; and one can make a hole in it and insert a piece of male wood and fix it with mud; in this way [the female tree] will bear fruit. Such are the subtleties of the interaction of *yin* and *yang*.⁴⁶¹

In the 17th century, the ginkgo continued to interest those who studied plants. Zhao Han 趙涵 writes, in the *Zhi pin* 植品 (1617), that there is a male and a female, that the seeds are similar and that those with three spikes are male. He also points out the need to sow them opposite one another, but he also emphasises that nobody has ever seen the flowers of the ginkgo and even if he reports that some say that they open slightly at midnight and then fall, he stresses that he does not know if this is true or not. A little later, Zhou Wenhua 周文華, the author of the *Ru nan pu shi* 如南圃史 (1620), in the part that he devotes to the ginkgo (*juan* 4), while referring to the [*Fen men*] *Suo sui lu* [分門] 瑣碎錄, expresses no reservations when he writes that 'they must be cultivated, planted in pairs, close to a pool; their images are reflected there and they procreate'. He adds another infallible way to obtain fruits, 'hollow out a hole in the female tree and fill it with male wood'. Finally, in Xu Guangqi's 徐光啓 edition of the *Nong zheng quan shu* 農政全書 (1639), various other remarks are added:

One can distinguish males and females in these trees; the males produce no fruit, the females do produce fruit. Their fruits are also both male and female: the females have two spikes, the males three. The females and males must be sown together; when the trees are close together, one obtains fruits. The female trees also produce fruit when they stand at the water's edge, through their reflected image, or else when one makes a hole into which one inserts some male wood sealed in with mud.⁴⁶²

It is known that the ginkgo belongs to the gymnosperms and, as such, produces not fruits but seeds. The seeds of the ginkgo resemble plums with a soft external layer that envelops putrid flesh and an inner layer that is horny and hard and protects the embryo.⁴⁶³ For the Chinese authors, it is the characteristics of this internal hard envelope of the embryo that they rely on to distinguish male from female. To our eyes, that fact tends to prove that, even in this case of, precisely, another dioecious plant, where it is clear that some plants bear 'fruits' that are remarkable because they have a particularly unpleasant smell when they fall to the ground, whereas others have no smell at all, the distinction between male and female is based solely on the particularities of these 'fruits'. Should we interpret this fact, as in the case of the hemp seeds, as a means of recognising the seeds that will produce male plants or female ones? Yet, as we have seen, the distinction has been made between trees that bear fruit, which are considered to be female, and the rest. This is proved by the procedure, mentioned by several authors, intended to get an isolated female plant to bear fruit: namely to make a hole in its trunk and fill it with male wood. It is remarkable in this case of a dioecious plant where the male and the female plant

⁴⁶¹ Li Shizhen (1975–81, p. 1801).

⁴⁶² Xu Guangqi (1979, p. 808).

⁴⁶³ Lawrence (1951, p. 358).

seem to have been clearly distinguished that the only two explanations suggested to account for fertilisation should be, on the one hand, the possibility for the plants of the two sexes to see each other either directly or in their reflections in a liquid surface, or, on the other hand, possibly thanks to an anthropomorphic idea, the insertion of a piece of male wood into a hole made in the trunk of a female plant and its sealing with mud. In the latter case, one obviously thinks of the possibility of grafting onto a female plant a branch taken from a male one, the flowers from which could ensure pollination. Yet the text never mentions the term 'branch', but always refers to a 'piece', *kuai* 塊, of wood. The puzzle is certainly in no sense resolved when one reads the first sentence of the *Zhong shu shu* (Book of Tree-Planting) (late 14th century) by Yu Zongben.⁴⁶⁴

Among all trees, there are males and females. The males for the most part do not produce fruit. It is possible to get them to do so by digging out a square hole one inch wide that is then filled by a female root.

We should note that this same text does not refer to the opposite procedure for giving fruits to a female ginkgo plant. In the *Mo ke hui xi* (1080) by Peng Cheng, and also in the *Suo sui lu*⁴⁶⁵ (early 12th century⁴⁶⁶) and the *Zhong yi bi yong* (? second half of the 13th century) by Wu Yi, there is a mention of two other trees that 'have male and female, the male being without fruits'.⁴⁶⁷ These are the *yang mei* 楊梅, the Chinese arbutus,⁴⁶⁸ a tree that is indeed dioecious, and the *zao jia* 皂莢, the Chinese honey locust,⁴⁶⁹ which has bisexual flowers. The *Mo ke hui xi* already mentions the information provided at the beginning of the *Zhong shu shu* on how to get males to bear fruit: 'Make a hole in their trunk, one inch square, and fill it with female wood'. I shall end the citation of examples relating to the sexual differences in plants with what Li Shizhen writes about another species of a dioecious tree, the *Torreya*, *fei* 榧,⁴⁷⁰ which neatly sums up the general idea that 'a tree has a female (*pin* 牝) and a male (*mu* 牡). The male flowers, the female produces fruit'.⁴⁷¹

This by no means exhaustive summary leads me in the first place to the conclusion that only in particular cases are herbaceous plants presented as having sexes, whereas this seems to be implicitly recognised for all trees, as we are reminded by the passage from the *Zhong shu shu*. That simple remark shows that the sexualisation of plants has very little to do with what today's biological sciences know about 'plant sexuality'. With polygonums (*he shou wu* 何首烏) and bamboos that sexuality is also very anthropomorphic. The anthropomorphism may take very particular forms, which are doubtless connected with particular moments in Chinese history. The text by Su Dongpo concerning bamboos underwent subtle

⁴⁶⁴ See pp. 406–7 below for doubts as to the paternity and completion date of this book.

⁴⁶⁵ See p. 28a in the manuscript edition of the Shanghai Library, edited by Hu Daojing.

⁴⁶⁶ See below, pp. 402–6. ⁴⁶⁷ Hu Daojing (1963b, no 102, p. 35).

⁴⁶⁸ *Myrica rubra* Sieb. et Zucc. (anon. 1977b, Fig. 2112).

⁴⁶⁹ *Gleditsia sinensis* Lam. (anon. 1977b, Fig. 2326).

⁴⁷⁰ *Torreya grandis* Fortune (Jia Zuzhang and Jia Zushan 1955, Fig. 2150).

⁴⁷¹ Li Shizhen (1975–81, Volume 3, p. 1827).

modifications in the passage of it that appears in the *Tu shu ji cheng* 圖書集成 (1726). There, where one reads in the original text ‘where there are female and male bamboos, there are many shoots, so when one plants bamboos, one has to choose females’, the 18th-century version prefers ‘the bamboos have males and females, the females have many shoots, which is why when one plants bamboos one chooses females for half of them’.⁴⁷² This second version places the reproduction of shoots within a framework of monogamous sexuality, which was not at all the case in Su Dongpo’s text. On this subject, with the exception of the case of the ginkgos, the hemp and the polygonums, the texts do not mention the mode of fertilisation. It is striking that the relation between the release of pollen on the part of male plants and the formation of seeds on the part of the female hemp plants, clearly noticed and noted in the ancient texts, is no longer mentioned later on and has never been the object of any experimentation reported in the texts. In contrast, the recognition of the need for the simultaneous presence of both male and female ginkgo plants in order for the latter to bear fruit has led to speculation about fertilisation through exchanged looks,⁴⁷³ and the need for trees to see one another either directly or indirectly by means of a reflection on a liquid surface. The other procedure that is invoked, the insertion of a male branch into a cavity made in the trunk of a female tree, possibly derives from an anthropomorphic view, just as do the repeated nocturnal embraces between polygonum plants presumed to be of different sexes. On the other hand, the insertion of a piece of wood from a female plant into a hole made in the trunk of a male tree in order to get the latter to produce fruit is a fine example, albeit a utopian one, of an egalitarian view of conception! No doubt the fundamental rules of *yin-yang*, as mentioned by practically all the authors that we have cited, provided a sufficient theoretical explanation for the phenomenon of plant reproduction, so that there was felt to be no need to proceed to more thorough research.

(3) PARASITISM AND THE EPIPHYTIC CONDITION

It may, at first sight, seem anachronistic to choose to present examples of plant parasitism separately. What follows will show that this choice is not arbitrary but is based on some ancient texts’ recognition of the notion of epiphytism. The first mention of what can be understood as parasitism by a mushroom is found in the *Er ya*. The entry *chu sui* 出隧 (Fig. 121),⁴⁷⁴ defined simply by the synonymous term *ju shu* 蘧蔬, is glossed as follows by Guo Pu: ‘*ju shu* 蘧蔬 [literally ‘the *ju* vegetable’]

⁴⁷² In *juan* 187 of the *Cao mu dian* 草木典, p. 28 of *ce* 546.

⁴⁷³ No doubt the role played by such a look corresponded to an ancient belief, for, as Li Shizhen reports (1975–81, Volume 4, p. 2887), ‘Some people say that there are no males among the lagomorphs/hares and that conception results from looking at the one in the moon in mid-autumn, but those are pure fantasies. Today, the males have two testicles and the ancient poem that refers to “males with agile paws and females with short sight” is in itself enough to shatter such a supposition’. See Métaillé (1993b, p. 52).

⁴⁷⁴ Bretschneider (1893, no 88).



Fig. 121. *Chu sui* 出隧, *ju shu* 蘧蔬, from *Er ya tu* (1883, *juan xia qian*, 11a). In this picture the term *ju shu* is understood not as the parasite inside the stems of *Zizania* but as a fungus growing on the ground.

resembles the *tu jun* 土菌 [earth mushroom], grows in the *gu cao* 菰草⁴⁷⁵ [water bamboo]. The people of Jiang Dong eat it. It is sweet and mucilaginous'. According to the interpretation that can be given to *zhong* 中 in the phrase *sheng gu cao zhong* 生菰草中, we can understand 'grows within' or 'in the middle' of the *gu cao*. I adopt the first interpretation on the basis of what is written in the *Er ya yi* 爾雅翼 of Luo Yuan 羅原, *jin shi* 進士 in the Qian Dao 乾道 period (1165–73). We learn that the root of what is called *jiao cao* 茭草 in the Jiang Nan (lower Yangzi) eventually thickens and in summer a mushroom, *jun* 菌, appears, which is called *gu cai* 菰菜.⁴⁷⁶ The product thus described constitutes one of the present-day treasures of Chinese cuisine and is nowadays sold under the name *jiao bai* 茭白. Today it is widely cultivated in the southern provinces.⁴⁷⁷ It is formed by the base of the floral stem which, initially hollow, thickens when, as it begins to grow, it is infested by a mushroom, *Ustilago esculenta* P. Henn. When quickly culled before its pores develop, it takes the form of a spindle similar to an ear of maize, with whitish flesh that is at once supple yet crunchy, with a sweet taste with a hint of nut flavour (Fig. 122).⁴⁷⁸

⁴⁷⁵ *Zizania caduciflora* (Turcz.) Hand.-Mazz.

⁴⁷⁶ Cited in *Shou Butsu Rui San* 庶物類纂, *juan* 7, *jun shu* 菌屬, *chu sui* 出隧, 2a.

⁴⁷⁷ See Wang Dongfeng (1987, pp. 195–6).

⁴⁷⁸ For the cultivation details, see Wu Gengming (1957, pp. 159–67).

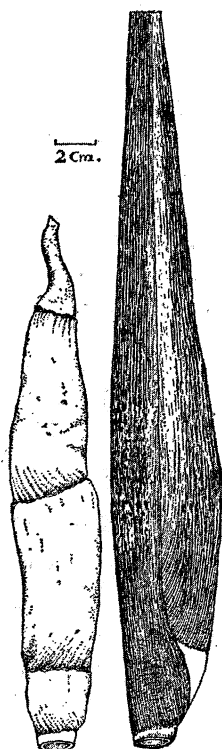


圖 59 象牙茭

Fig. 122. Lower part of a stem of *Zizania caduciflora* (Turcz.) Hand.-Mass. (right) and the *jiao bai* 茭白, which is inside (left), from Wu Gengmin (1957, p. 162).

This parasitism prevents the plant from flowering and producing seeds, *gu mi* 菰米, which are known as 'Indian rice' or 'wild rice'. Although the notion of parasitism is not expressed in the text, the fact that it states that the *ju shu* 'grows within' the grass, *gu*, would certainly seem to distinguish the *ju shu* from the host plant, *gu cao*. The other view is that it seems to be simply a matter of a mushroom growing in the *gu cao* fields, a hypothesis that is adopted by the publishers of the Song edition of the *Er ya*, reproduced in 1883, in which the illustration leaves no room for ambiguity in that choice. Although it is not possible to be entirely certain, my choice for the first hypothesis is reinforced by the commentaries of other eminent philologists, such as Hao Yixing 郝懿行 (+1755-+1823) in the *Er ya yi shu* 爾雅義疏 and Cheng Yaotian 程瑤田 (1725-1814) in the *Jiu gu kao* 九穀考.⁴⁷⁹ Most of the texts that they cite make it possible to identify without ambiguity the seeds that are named *gu mi* 菰米 or *diao hu* 彫胡. Hao Yixing notes that in the *Xi jing za ji* 西京雜記, Ge Hong 葛洪

⁴⁷⁹ Published in the *Tong yi lu* 通藝錄, *juan* 10.

(+284–+364) writes that there are two *gu* 菰, the grain, *mi* 米, which the people of Changan call *diao hu* 彫胡, and the ‘head’, *shou* 首, which is called *lü jie* 綠節, a term synonymous with *ju shu* 蘼蔬.⁴⁸⁰ He continues as follows:

today . . . in the spring one extracts the white shoot (*bai meng* 白萌) which is called *gu shou* 菰首 [head of *gu*] or *gu shou* 菰手 [hand of *gu*]. It is the small mushroom (*xiao jun* 小菌) that is produced by its root and is called *gu cai* 菰菜, according to the notes in the *Shu ben cao* 蜀本草⁴⁸¹ and that is also called *jiao bai* 茭白, a popular term for *gu* being *jiao* 茭.

Proof of the existence of the parasite mushroom is attested by the recognition of the spores that form within the swollen stem if it is allowed to grow old. Chen Zangqi 陳藏器 writes, ‘within there is black dust resembling ink, which is called *wu yu* 烏鬱’, as is reported by Cheng Yaotian.⁴⁸² In a note, Cheng also explains the presence of two types of plant, the one sterile and the other fruit-bearing on account of a sexual difference.⁴⁸³ The female plant does not produce seeds but makes shoots⁴⁸⁴ – that is to say, swollen stems – while the other, which flowers and produces fruit, is the male. He remarks that ‘this is quite the opposite to hemp’.

The case of another plant, the name of which, *tu si* 菟絲, today designates an epiphyte plant, the dodder,⁴⁸⁵ has been mentioned above.⁴⁸⁶ It is noted in the *Lü shi chun chiu* 呂氏春秋:⁴⁸⁷ ‘Some say that the dodder (*tu si*) has no root; the dodder does have a root but this root is not attached to it; it is the *fu ling* 茯苓’.⁴⁸⁸ Another citation from the *Xian ren zhuan* 仙人傳 noted in the *Bo wu zhi* (Compendium of Extensive Knowledge) by Zhang Hua (+232–+300) bears out this first assertion, for it explains that when ‘the resin of pines and cypresses (*song bai zhi* 松柏脂) penetrates into the soil, in one thousand years it is transformed into *fu ling*, and the *fu ling* is transformed into amber (*hu po* 琥珀)’.⁴⁸⁹ Taking into account the context mentioned earlier as well as this one, we may conclude that if the dodder is an indicator of *fu ling*, it is indeed attested that it has no roots. On the other hand, *fu ling* seems to be associated with pines and cypresses, as is amber, which accounts for their classification in the *Ben cao gang mu* in the trees section, *mu bu*, in the category of tree parasites, *yu mu lei* 厲木類, as I shall soon be showing.

⁴⁸⁰ *Xia zhi* 1, p. 27b.

⁴⁸¹ The *Shu ben cao*, published by Han Baosheng between +934 and +965, is a revision of the *Xin xiu ben cao*; see SCC Volume 6, Part 1, p. 277.

⁴⁸² *Jiu gu kao*, 68a. ⁴⁸³ *Jiu gu kao*, 68b. ⁴⁸⁴ *Jiao sun* 茭筍.

⁴⁸⁵ *Cuscuta chinensis* Lam., and also *C. japonica* Choisy. ⁴⁸⁶ See p. 272 above.

⁴⁸⁷ Lü Buwei (1989, Chapter 9, p. 70). ⁴⁸⁸ *Poria cocos* (Schw.) Wolf.

⁴⁸⁹ However, the text then states that whereas in the Tai Shan there is *fu ling* but no amber, elsewhere one can extract amber but there is no *fu ling*. The author then presents another hypothesis relating to the origin of amber: might it not come from burned wasps’ nests? Tao Hongjing rejected that hypothesis as unrealistic. Kou Zongshi 寇宗奭, the author of the *Ben caoyan yi* 本草衍義 (1071), pursued that line of reasoning, finding it impossible that, if the amber was indeed a transformation of the *fu ling*, wasps, bees and ants should be stuck there after one thousand years. Li Shizhen (1975–81, Volume 3, p. 2152), who reports these various suggestions, rejects the story of the transformation of the *fu ling* as a ‘false rumour’ and proposes a rational explanation, namely that the amber results from the transformation, after certain liquids (literally ‘saliva’, *jin ye* 津液) from liquidambar *feng* 楓/sweet gum (*Liquidambar taiwaniana* Hance) have penetrated the soil and lain there for several years.

In the above examples, the notions of parasites or epiphytes are not expressed by specific words in these descriptions, which leaves room for doubt as to how the plants just cited were understood. However, it seems likely that the fact of noting that a plant has no root certainly indicates that it possesses a particular status, one that implies that it is an epiphyte, given that it has to find some other root in order to be able to grow. Yet explicit words did exist and are to be found in ancient texts where their meaning is that they ‘live as parasites, inhabiting others’. A commentary by Mao Heng 毛亨 (fl. ?–220–, –150) on the poem ‘Kui bian’ 頽弁 in the Xiao Ya 小雅 in the *Shi jing* 詩經 (Book of Odes) describes a plant named *niao* 萋 as *ji sheng* 寄生 – ‘lives as a parasite’. Similarly, the term used by Li Shizhen to name the category of parasites on trees, *yu mu* 厲木 (literally, ‘inhabits trees’) is already attested in the *Er ya* and is glossed by Guo Pu as ‘lives as a parasite on trees’, *ji sheng shu* 寄生樹, also known as *niao* 萋.⁴⁹⁰ It is therefore no surprise to find that this line of the *Shi ji*, in which the term *niao* appears, states that ‘the *niao* and the *nü lu* 女蘿 spread over the [trees in the category of] pines–cypresses’. The *Er ya* gives *nü lu* as a synonym for three other terms, *tang* 唐, *meng* 蒙 and *tu si* 菟絲, which, for the authors of the book, confirms the epiphyte nature of that last plant. Mao Heng’s commentary also adds a synonym to this list, *song lu* 松蘿. However, the synonymy between *nü lu* and *tu si* is qualified by a commentary by Zheng Xuan (+127–200) on the Book of Odes. Referring to the *nü lu*, he writes, ‘it is called *tu si* when growing on herbaceous plants and *song lu* when growing on trees. Emil Bretschneider, whose translation I have used here, adds, ‘I understand that he means by *tu si* and *song lu* different plants, not one plant with two names’.⁴⁹¹ I agree with his opinion and, in the light of these various comments, understand that *nü lu* is a popular generic term and *tu si* and *song lu* are two specific popular terms, the first of which designates the dodder, the second usneas.⁴⁹²

Tao Hongjing (456–536) was certainly one of the first to propose a description of the phenomenon of parasitism. *Juan* 12 of the *Zheng lei ben cao* includes a long citation on the subject of a plant named *Jiang ning fu sang shang ji sheng* 江寧府桑上寄生, ‘the parasite of the mulberry tree’ of the Jiangning prefecture (Fig. 123). It runs as follows:

what is on the mulberry tree is called ‘lives as a parasite on the mulberry tree’. Similarly, the poets say that it grows on pine trees; there are some specialists who use what is on willows and what is on liquidambar. So each of these plants is named after its tree. The plants are similar in form and category, but their uses vary depending on the place where the sap of the root originates. They grow between the branches of the trees. The parasite roots (*ji gen* 寄根) are inside the nodes and the bark. The leaves are round, dark green, thick and shiny

⁴⁹⁰ See Bretschneider (1893, no 262). *Niao* and its other synonyms, *sang shang ji sheng* (a parasite on the mulberry tree – literally ‘lives as a guest on the mulberry tree’) and *jie xie* 寄屑 (in the *Shen nong ben cao jing*), are today identified with *sang ji sheng*, the name of *materia medica* obtained from various plants, all of which are epiphytes: a mistletoe/ *Viscum coloratum* (Kom.) Nakai, and various kinds of *Loranthus*, *Loranthus paraticus* (L.) Merr., *L. gracilifolius* Schult., *L. yadoriki* Sieb. (anon. 1977b, Fig. 4046).

⁴⁹¹ Bretschneider (1893, no 450).

⁴⁹² *Usnea longissima* Arch. and *Usnea diffracta* Vain. (anon. 1977b, Fig. 2555).



Fig. 123. Parasite of the mulberry, in the *Zheng lei ben cao* (1249, juan 12, 33b), after Tang Shenwei (1957, p. 304).

and they tear easily . . . The flowers form at the fourth moon, the fruits at the fifth. They are as big as adsuki beans. Nowadays they are to be found everywhere but the best come from Peng Zheng. Locally they are called *xu duan* 續斷 and they are used in the same way as the *xu duan*⁴⁹³ that the [*Shen nong*] *Ben [cao] jing* places among the top-rank drugs (*shang pin yao* 上品藥). The therapeutic indications vary. How could they all be the same? What is prescribed by the market folk, who confuse everything and know nothing, is *sang nuo* 桑柎,⁴⁹⁴ the black mushroom, which is altogether different from this.⁴⁹⁵

Upon reading this text, one may well wonder whether the botanical identifications with mistletoe or *Loranthus* that are currently accepted for *sang shang ji sheng* really do correspond to the description given by Tao Hongjing, for the dates of flowering and fructification are noticeably different. On the other hand, the illustration, which shows pairs of opposite leaves, is reminiscent of a *Loranthus* (Fig. 124). We should note the precision of Tao Hongjing's remark concerning the spot where the epiphytes take root, for preference in fragile or broken places in the bark. Travelers' accounts of the southern regions also contain observations on parasitic plants. For example, Shen Ying 沈瑩, who lived in the Jin principality in the second half of the 3rd century, during the Three Kingdoms period, wrote a *Linhai yi wu zhi* 臨海異

⁴⁹³ Today, two species of *Dipsacus* provide *materia medica* that goes by that name. Anon. (1977b, Fig. 4706).

⁴⁹⁴ This is a mushroom much used in Chinese food, *Auricularia auricula* (L. ex Hook) Underw.

⁴⁹⁵ On p. 304 of the 1249 edition (Tang Shenwei 1957) and p. 347 of the 1108 edition (Tang Shenwei 1970).

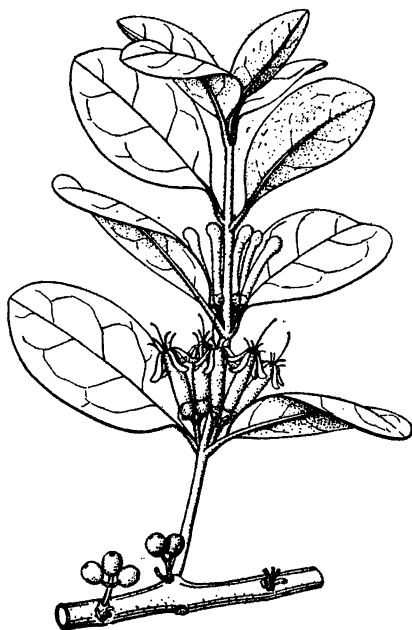


Fig. 124. *Loranthus yadoriki* Sieb., epiphyte growing on mulberry trees, from anon. (1972–6, Volume 1, p. 537).

物誌 (Memoir on the Strange Things in [the Commandery of] Linhai),⁴⁹⁶ in which he gives a description of a ‘bell-liana’, *zhong teng* 鍾藤.⁴⁹⁷

It attaches itself to the tree in order to take root, it is supple and weak, its tendrils grow along the tree and spread upward and downward. This liana grips the tree and the tree dies. Furthermore, it has a harmful sap (*e zhi* 惡汁) which provokes rapid rotting. The liana grows fully in a tree, as if it were naturally of wood. The largest of them may be as many as ten arm-spans [thick].’

Another liana is mentioned by another author of the Three Kingdoms period (+220–+280), Wan Zhen 萬震, in the *Nan zhou yi wu zhi* 南州異物誌 (Memoir on the Strange Things in the South):

The banyan⁴⁹⁸ *rong mu* 榕木, soon after it begins to grow, leans against another tree, in the same manner as the *fu fang teng* 扶芳藤⁴⁹⁹ of foreign regions; it cannot stand upright on its own and twists itself around another tree, [the two of them] tightly intertwining, like the

⁴⁹⁶ Coastal region to the south of present-day Zhejiang. The work was partially reconstructed from citations taken from it, the most ancient of which is to be found in the *Qi min yao shu*.

⁴⁹⁷ Mou Qiyu and Qiu Zeqi (1990, pp. 33–4). The authors identify this liana as a *Ficus*.

⁴⁹⁸ *Ficus microcarpa* L. (anon. 1977b, Fig. 5278).

⁴⁹⁹ According to Mou Qiyu and Qiu Zeqi (1990, p. 16). This is a *Ficus*, not the plant that today bears this name and is a spindle tree, *Euonymus fortunei* (Turcz.) Hand.-Mazz.

mesh of a net. Later the *li* [principles] fuse together in the barks and there is luxuriant growth, with the tree possibly reaching twelve or fourteen yards high.⁵⁰⁰

Zhou Qufei 周去非, who had graduated *jìn shì* in 1163 or 1164 and who lived in Guilin in the Zhun Xi period (1174–90), had also observed bastard banyans (*rong*). He describes them in the *Ling wai dai da* 嶺外代答 (Information on What is beyond the Passes), which tells us that this tree

grows tall easily. Its roots emerge halfway up the trunk and stretch down . . . the birds carry off its seeds in their beaks so that they develop as parasites on other trees and produce an abundance of vegetation. Then their slim roots stretch down the trunks of the other trees until they reach the ground. When it benefits from the *qi* [material force] of the earth, the banyan is stimulated and becomes stronger and, after a while, it grows taller than its host and envelops it completely. In Liu Zhou, opposite the temple of Liu Hou, there is a large banyan inside which there grows a sugar palm (*guang lang* 桃榔).⁵⁰¹ People cannot stop talking about it, as if it is an extraordinary thing. However, sensible people know that what happened originally was that banyan seeds installed themselves on the sugar palm which, after many years, found itself surrounded by this parasite tree. There really is not anything strange about it.⁵⁰²

Li Shizhen entitles the fourth category of the trees section, *yu mu lei* 厲木類. This 'category of tree parasites' contains eleven entries, an examination of which should make it possible to understand what that title encompassed. The first plant cited is the *fu ling* 茯苓,⁵⁰³ a mushroom that we have just encountered that was believed to be a root of the dodder. Li Shizhen, after citing a variety of texts, refutes the idea that the dodder grows on top of it but provides no explanation of the origin of the *fu ling*, apart from a philological note associating this plant with a pine tree. In truth, it is a matter of tuberous masses that are produced by the mycelium of this mushroom and that take the form of spherical, flattened or ovoid lumps of variable size, the smaller ones being about the size of a fist, the largest reaching a diameter of over thirty centimetres. They grow as parasites on the roots of various pine trees, in particular the *Pinus massoniana* Lamb., *ma wei song* 馬尾松, and they penetrate to a depth of about thirty centimetres. The second rubric concerns amber, *hu po* 琥珀.⁵⁰⁴ As we have seen, Li Shizhen thinks that this results from a transformation of the liquids (*jīn yè* 津液) that are produced by pine trees and liquidambers after they have lain in the ground. We next have *yì* 璽, which is a dark-coloured amber. This is followed by *zhu ling* 豬苓,⁵⁰⁵ 'pig's dung', which is the dried carpophor of a polypore,⁵⁰⁶ so-called on account of its form and aspect, which are similar to that of pig dung. Sometimes it looks like a mass of ginger rhizomes, dark brown in colour, of a quite supple texture. They grow on the roots of a variety of mountain trees – oaks, liquidambers, maples and so on. The *lei wan* 雷丸 that Li Shizhen next

⁵⁰⁰ See Mou Qiyu and Qiu Zeqi (1990, pp. 7–23).

⁵⁰¹ *Arenga pinnata* (Wurmb.) Merr. (anon. 1977b, Fig. 3644).

⁵⁰² See Zhou Qufei (1996, pp. 176–7).

⁵⁰³ Li Shizhen (1975–81, p. 2145).

⁵⁰⁴ Li Shizhen (1975–81, p. 2152).

⁵⁰⁵ Li Shizhen (1975–81, p. 2155).

⁵⁰⁶ *Polyporus umbellatus* (Pers.) Fr.; anon. (1977b, Fig. 4545).

describes, the ‘thunder balls’,⁵⁰⁷ also called ‘thunder dung’ (*lei shi* 雷矢) or ‘bamboo dung’ (*zhu ling* 竹苓), are likewise the carpophors of a polypore⁵⁰⁸ that take the form of rounded or ovoid elements with a stripy surface, dark black–brown in colour and between 0.8 and 2.5 centimetres in diameter. They develop as parasites on diseased bamboo plants. Li Shizhen does not consider either the *fu ling*, the *zhu ling* or the *lei wan* to be mushrooms. On the subject of the next entry, *sang shang ji sheng* 桑上寄生,⁵⁰⁹ ‘parasite on the mulberry tree’, whose treatment by Tao Hongjing we have just considered, Li Shizhen produces a neat explanation for the use of the terms *ji sheng* 寄生, *yu mu* 寓木 and *niao* 鷲:

This thing lives by ‘installing itself as a parasite’ (*ji yu* 寄寓) on other trees, as a bird that would alight there. That is why one says *ji sheng* 寄生 [the literal meaning of which is ‘to live like a parasite’], *yu mu* 寓木 [the literal meaning of which is ‘to live in the trees’] and *niao mu* 鷲木 [which could be translated as ‘being like a bird on a tree’]. A popular name is *ji sheng cao* 寄生草 [parasitic grass]. In the *Dong fang shuo zhuan* 東方朔傳⁵¹⁰ it is written: ‘On the tree it is *ji sheng* 寄生, on the ground it is *ji sou* 竄藪’.⁵¹¹

That last passage certainly seems to be evidence of a distinction between parasitism in the air and parasitism on the ground, for which I have come across no other references. A commentary by Zhu Junsheng 朱駿聲 explains that *ju sou* ‘belongs to the *niao lu* 鷲蘿 group’, *niao lu zhi shu* 鷲蘿之屬.⁵¹² This note also contains interesting information about the recognition of a folk category of plant parasites that is named by the juxtaposition of the two terms *niao* and *luo*, in accordance with a principle already mentioned.⁵¹³ Without forming a binome, the two terms were already associated in the *Shi jing* poem mentioned above, *niao yu lu shi yu song bai* 鷲與蘿施于松柏, ‘the *niao* and the *nü lu* spread over the [trees in the category of] pines–cypresses’. Soon we shall have to go more deeply into the generic meaning of these two terms. But for now, along with Li Shizhen, let us return to the parasite on the mulberry tree. ‘The parasite is two to three feet tall’,⁵¹⁴ he writes; ‘its leaves are rounded and slightly pointed, thick and mucilaginous, and their upper side is dark green and shiny, the underside being purplish and downy’. He goes on to say that common people make use of the parasites found on all kinds of trees but that it is not a prudent thing to do given the different nature of the respective *qi*, for some may even be poisonous. Finally, on the basis of what Zheng Qiao 鄭樵 said in the *Tong zhi* 通志, he too concludes that there are two kinds of *ji sheng*, ‘parasites’, the larger being called *niao*, the smaller *nü lu*. According to the identifications given,

⁵⁰⁷ Li Shizhen (1975–81, p. 2157).

⁵⁰⁸ *Polyporus myllitae* Cook. et Mass. (anon. 1977b, Fig. 5148). A second identification is given in Kitamura Shiro (1985, p. 542), *Omphalia lapidescens* Schroet.

⁵⁰⁹ Li Shizhen (1975–81, p. 2158).

⁵¹⁰ The work of a Daoist, Guo Xian 郭憲, who lived under the later Han (+25–220).

⁵¹¹ Li Shizhen (1975–81, p. 2158).

⁵¹² Cited in the *Ci yuan* 辭源 (1980, Volume 2, p. 858). Zhu Junsheng graduated during the Dao Gang period (1821–51). He was the author of a commentary on the *Shuo wen tong xun ding sheng* 說文通訓定聲.

⁵¹³ Like *tao li*, *xing mei*, etc. See pp. 45, 55 above. ⁵¹⁴ Between sixty-six and ninety-nine centimetres.

the large ones are probably mistletoe or *Loranthus*. As for the smaller ones, they are probably the usneas (mosses or lichens) mentioned in the next entry of the *Ben cao gang mu*, *song luo* 松蘿.⁵¹⁵ Li Shizhen goes on to indicate two synonyms for this term found in the *Shen nong ben cao jing*, *nü luo* 女蘿 and *song shang ji sheng* 松上寄生, 'parasite of the pine'. On the subject of the following entry, *feng liu* 楓柳,⁵¹⁶ Li Shizhen emphasises the fact that this does not refer to the tree with this name,⁵¹⁷ the bark of which is used as *materia medica*, but instead refers to an epiphyte of the liquidambar. Next he cites *tao ji sheng* 桃寄生, the epiphyte of the peach tree, then *liu ji sheng* 柳寄生, the epiphyte of the willow.⁵¹⁸ The next one, *zhan si* 占斯,⁵¹⁹ is an unidentified epiphyte of the camphor tree, *zhang mu* 樟木.⁵²⁰ The last of this series of epiphytes is *shi ci mu* 石刺木.⁵²¹ The shrub on which it grows, called *jin ci* 靳刺 'by the people of Jiang Xi', is identified as *Paliurus ramosissimus* (Lour.) Poir.⁵²²

On reading this list, one realises that Li Shizhen has, in this chapter, collected together plants that are today recognised to be epiphytes. What is striking is that he is above all concerned with typology and has developed an argument founded essentially on citations from his predecessors, with virtually no remarks based on direct observation. This process has led him logically enough to progress from the level of the roots of trees that bear various mushrooms to their branches that are 'inhabited' by a variety of epiphytes that grow there either upright or else 'floating as they crawl along', *fu man* 浮蔓, as the author of the *Pi ya* 埤雅, Lu Dian 陸佃 (late 11th–early 12th centuries) evocatively puts it, when referring to usnea lichens. On the subject of plants that are lichens, Li Shizhen, commenting on various citations, concludes that they are certainly not dodders, although he gives no details about the nature of these plants. In the light of these citations recorded by Li Shizhen and accompanied by his own remarks, it is now possible to form a better idea of the semantic field of the category earlier mentioned, *niao luo* 蔦蘿. That name refers on the one hand to ligneous epiphytes and on the other to usneas of a herbaceous nature, and so this now leads me, through a natural transition, to consider algae.

(4) AQUATIC PLANTS

(i) *Water grasses*

Before entering upon a study of recorded knowledge about algae, we should find out whether such a category of plants existed in ancient Chinese, and, if so, what criteria were used to define the plants that belonged to that category. In order to try to find an answer to the first of those questions, I shall turn first to two fundamental

⁵¹⁵ Li Shizhen (1975–81, p. 2159).

⁵¹⁶ Li Shizhen (1975–81, p. 2161).

⁵¹⁷ *Pterocarya stenoptera* DC. (anon. 1977b, Fig. 2563).

⁵¹⁸ Li Shizhen (1975–81, p. 2161).

⁵¹⁹ Li Shizhen (1975–81, p. 2162).

⁵²⁰ *Cinnamomum camphora* (L.) Presl. (anon. 1977b, Fig. 5439).

⁵²¹ Li Shizhen (1975–81, p. 2163).

⁵²² Anon. (1977b, Fig. 625). However, as Kitamura Shiro (1985, p. 544) points out, we note that one of the rare characteristics mentioned in the text of the *Ben cao gang mu*, the presence of hooks on the branches, is not found on this shrub, which only bears thorns.

texts, the *Er ya* and the *Shuo wen jie zi*. The Chinese term *zao* 藻 will serve as a key. For botanists, this term today means ‘alga’, which is defined as ‘a thallophyte possessing chlorophyll’. It appears in the *Shuo wen jie zi*, glossed as ‘water grass’, *shui cao ye* 水草也. Not until the appearance of the *Ben cao gang mu* (+1596) do we find indexes of various categories of aquatic plants. Here, Li Shizhen distinguishes a category of wild aquatic grasses, *shui cao lei* 水草類 (grasses section, *juan* 19), a category of aquatic vegetables, *shui cai lei* 水菜類 (vegetables section, *juan* 28) and a category of aquatic fruits, *shui guo lei* 水果類 (fruits section, *juan* 33). The principal algae mentioned in the text are to be found in the first two of those categories. The category of ‘mosses and their kinds’,⁵²³ *tai lei* 苔類 (grasses section, *juan* 21), also contains some. However, no category corresponding to algae, in the modern sense of the term, is to be found either in works of *materia medica* or in agricultural works. Nor does Li Shizhen place in distinct categories marine plants on the one hand and freshwater plants on the other. The absence of differentiation between these two groups of plants was criticised by the Japanese neo-Confucianist scholar Kaibara Ekiken (1630–1714) in an essay prefacing his *Yamato honzō* 大和本草 (*Materia Medica* of Japan) (1709). He, for his part, created within the grasses two clearly distinguished categories, the *suisō* 水草, freshwater grasses, and the *kaisō* 海草, marine grasses (Grasses, 4, *juan* 8).⁵²⁴ The distinction was not unknown in Chinese writings but, as far as I know, it was never used in classification and, in the *Zhi wu ming shi tu kao* 植物名實圖考 (1848), one single ‘category of aquatic grasses’, *shui cao lei* 水草類, groups together all the various plants that live in either fresh or marine water, whether they be algae or more evolved plants. Now let us trace the history of these plants through whatever the Chinese sources can tell us, paying most attention, as far as possible, to true algae.

The *Er ya* contains various clear references to aquatic plants. In the chapter devoted to grasses, a *jun* 蓴⁵²⁵ is mentioned along with its synonym *niu zao* 牛藻 ‘aquatic grass for bovines’. Guo Pu writes that it resembles the *zao* 藻, ‘water grasses’, and that the people of Jiang Dong call it *ma zao* 馬藻, ‘aquatic grass for horses’ (Fig. 125). *Ping* 萍⁵²⁶ and *pin* 蘋⁵²⁷ designate two kinds of plant that ‘float in the water’, differentiated by their size, the second of the two being bigger (Fig. 126). The *qin* 芹 is for Guo Pu a ‘celery that lives in the water’ (Fig. 127).⁵²⁸ *Tan* 藻⁵²⁹ glossed by *shi yi* 石衣 ‘stone clothing’, is defined by Guo Pu as the same thing as the *shui tai* 水苔, ‘water mosses’, also known as *shi fa* 石髮, ‘stones’ hair’. He reports that these are eaten in Jiang Dong, to the east of the Yangzi river. He adds that their leaves resemble a larger version of those of the Chinese shallot⁵³⁰ and that they grow in the depths of the water. A *mei* 蘗⁵³¹ is described as ‘a shoot that follows the

⁵²³ ‘Mosses and his kinds’ is an expression that is found in ‘The Tables of English Names’ of *The Herbal* by John Gerard (1975) (1st edn 1633). This seems to me to be an appropriate translation for *tai lei* in the *Ben cao gang mu*, in that *tai* has a larger reference than ‘moss’ in modern botany.

⁵²⁴ See pp. 554–9 below. ⁵²⁵ Bretschneider (1893, no 111). ⁵²⁶ Bretschneider (1893, no 113).

⁵²⁷ Bretschneider (1893, no 114). ⁵²⁸ Bretschneider (1893, no 116). ⁵²⁹ Bretschneider (1893, no 129).

⁵³⁰ *Allium chinense* G. Don., *xie* 薤. ⁵³¹ Bretschneider (1893, no 166).



Fig. 125. *Jǐng* 荇 = *niú zǎo* 牛藻, from *Er ya tu* (1883, *juan xia qian*, 14a).

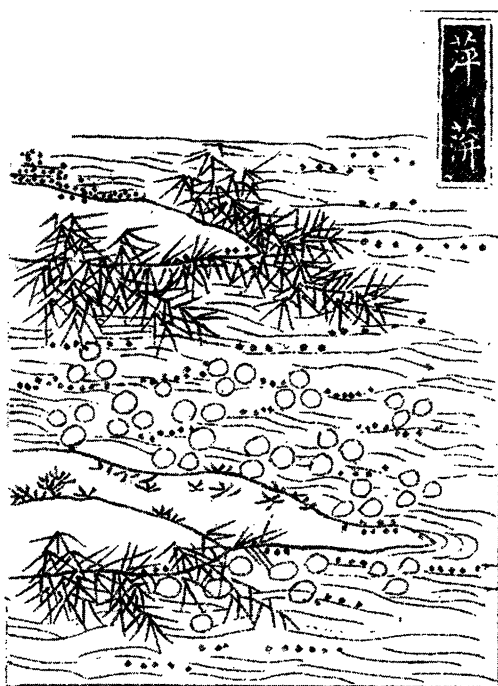


Fig. 126. *Píng* 萍 (*Lemna* sp. or *Spirodela* sp.), cf Wang Ningzhu et al. (1983, pp. 270, 271), and *pín* 蘋 (*Marsilea quadrifolia* L.); cf Gao Mingliang (2006, p. 96). From *Er ya tu* (1883, *juan xia qian*, 14a).



Fig. 127. Celery (*qin* 芹, *Apium graveolens* L.), from *Er ya tu* (1883, *juan xia qian*, 14b).

water', *zong shui sheng* 從水生, and Guo Pu's commentary says that 'it lives in the water', *sheng yu shui zhong* 生於水中 (Fig. 128). Another term, *tan* 蓴,⁵³² is defined as *hai zao* 海藻, 'aquatic grass of the sea'. Guo Pu explains that this is a plant, cited in *materia medica*, that is also called *hai luo* 海蘿, 'sea usnea', and that it resembles tangled hair and grows in the sea (Fig. 129). Another rubric refers to *lun* 綸, 'cords', and *zu* 組, 'ribbons', that are to be found in the Eastern Sea.⁵³³ Guo Pu adds that these are 'mottled grasses that grow in the sea' and are named after their resemblance to ornaments for clothing. Let us try to identify these various plants by first finding out if their names are mentioned in the *Shuo wen jie zi*. At the *jun* 蓴 entry, we find a definition, 'aquatic grass of wells', *jing zao* 井藻. However, most commentators noted a different interpretation for the first character in this definition. One should not read *jing* 井, 'well', but *niu* 牛, 'bovine', the confusion having arisen from the similarity between the graphs of the two characters. With this in mind, a commentary by Duan Yucai (1735–1815) postulates that the names of plants that are determined by *niu* 牛, 'bovine' or *ma* 馬, 'horse' designate plants that are very big.⁵³⁴ He also points out, referring to Lu Ji,⁵³⁵ that there are two kinds of *zao* 藻,

⁵³² Bretschneider (1893, no 197).

⁵³³ Bretschneider (1893, no 201).

⁵³⁴ Repeated in the *Shuo wen jie zi yuan shi wu*, cited in Ding Fubao (1928, p. 287b).

⁵³⁵ In his commentaries on the *Shi jing*, *Shi yi shu*.



Fig. 128. *Mei 蘩* (*Potamogeton* sp.), from *Er ya tu* (1883, *juan xia qian*, 19b).

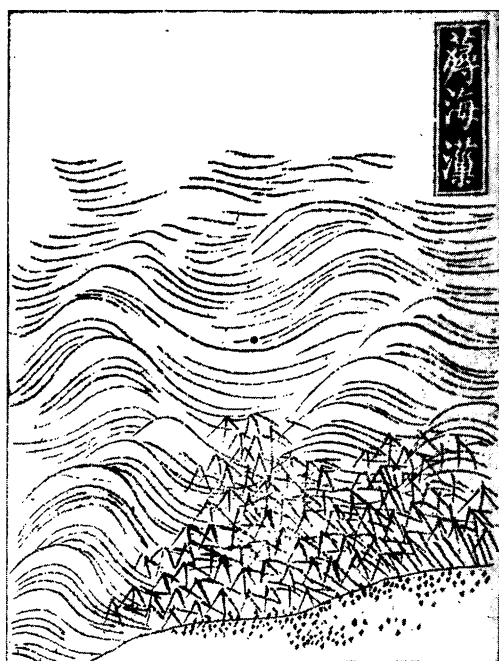


Fig. 129. *Tan 蓴* (*Sargassum fusiforme* (Harv.) Setchell), from *Er ya tu* (1883, *juan xia qian*, 23a); cf Gao Mingliang (2006, p. 292).

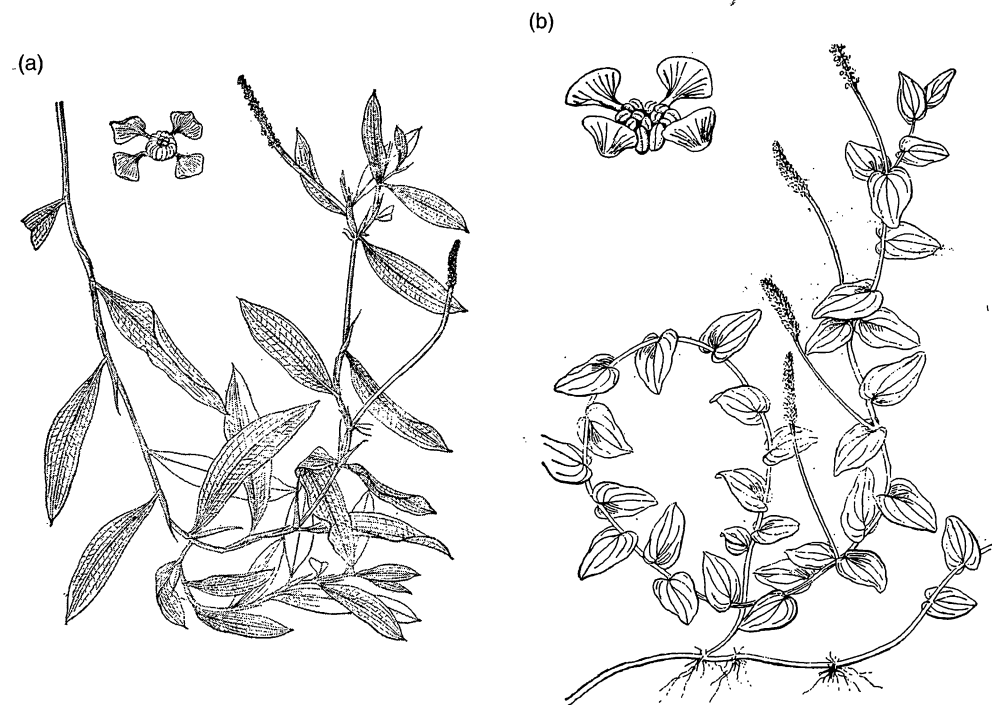


Fig. 130. Two species belonging to the *Potamogeton* genus: (a) *P. lucens* L., 1. flower, 2. style; (b) *P. perfoliatus* L., in Wang Ningzhu et al. (1983, pp. 51, 53). Compare with the plant in Fig. 127.

‘water grass’. One kind has leaves similar to those of betony and a stem, as thick as a chopstick, that is four or five feet long. The other kind has a flat stem and leaves resembling those of artemisias and these are called *ju cao*, 聚藻 ‘grouped water grasses’. These remarks suggest that *jun* 荇 designates an aquatic plant that is relatively large. Bretschneider suggests names such as *Potamogeton* and *Najas*.⁵³⁶ The shape of the leaves of certain species, and also that of the stem, favours the first identification (Fig. 130). ‘That which has no roots and lives by floating on the water’ defines *ping* 萍,⁵³⁷ whereas, immediately after, *pin* 蘋 is defined in comparison to the preceding plant, as ‘this is a large *ping*’.⁵³⁸ Both these terms should be understood in a generic sense. The former certainly designates small floating plants such as duckweed, which probably belong to botanical genera such as *Lemna*, *Spirodela*, *Azolla* or *Wolffia*. As the second term designates other plants that likewise float on the surface of the water but are larger, it may refer to genera such as *Marsilea* or *Salvinia*. The term *tan* 蕒 does not appear in the *Shuo wen jie zi*,⁵³⁹ and seems not to have been used in texts later than the *Er ya*. On the other hand, several

⁵³⁶ Bretschneider (1893, no 111).

⁵³⁷ Ding Fubao (1928, p. 257b).

⁵³⁸ Ding Fubao (1928, p. 258b).

⁵³⁹ Ding Fubao (1928, p. 6909a).

of its synonyms are subsequently mentioned. *Shi yi*, 'stone clothing', to which the *Er ya* refers, appears in a list of aquatic plants that are mentioned in an elegy recorded in the biography of Shen Yue 沈約 (+441–513) in the *Liang shu* (History of the Liang).⁵⁴⁰ This term is associated with *hai fa* 海髮, 'sea hair'. *Shi fa* 石髮, 'rock hair', another synonym cited by Guo Pu, is to be found in a monograph on strange things, *Yi wu zhi* 異物志, the author of which is not known, which is cited in the *Tai ping yu lan*. Present-day publishers of the text of the monograph,⁵⁴¹ while recognising that it is certainly the same term as that cited by Guo Pu, do not suggest any botanical identification. The description to be found in the *Yi wu zhi* complements that given by Guo Pu: 'A sea grass, grows in clumps on rocks in the sea, the size of Chinese chives,⁵⁴² with leaves that resemble those of sedge [*Scirpus* sp.] and its stem does not branch out. When steamed with meat, it tastes delicious'. The fact that its leaves are compared to those of onions by Guo Pu and to chives by the unknown author of the second citation encourages me to regard this 'rock hair' as eelgrass rather than an alga (seaweed).⁵⁴³ The *Shuo wen jie zi* considers *mei* 蘘 to be a synonym of *mei wu* 蘘蕪 and to designate a plant with a strong smell.⁵⁴⁴ The term *mei wu* is itself a synonym for *xiong qiong* 芎藭, which designates a fragrant umbellifer, the root of which possesses medicinal properties and is nowadays identified as a type of lovage.⁵⁴⁵ However, the definition given in the *Er ya* deters one from regarding this as an aquatic plant in the strict sense of the term and I shall not be including it in this category. But *tan*⁵⁴⁶ 蓴, which is defined as 'an aquatic sea grass', *hai zao* 海藻, does seem to be the name of a seaweed. *Hai cao* appears among the names for *materia medica* of the middle rank, *zhong pin* 中品, in the *Shen nong ben cao jing*. A number of texts cited in the *Zheng lei ben cao* link plants named here with the sea.⁵⁴⁷ Thus the *Ming yi bie lu* states that they grow in the marshes of the Eastern Sea. Tao Hongjing says that they grow on islands in the sea, are black in colour and resemble a slightly larger version of the 'dishevelled hair', while 'the largest also resemble the leaves of aquatic plants'. He adds that there are also *shi fan* 石帆, 'veils of stone' (corals), shaped like cypresses and *shui song* 水松, 'water pines', shaped like pine trees. Chen Zangqi, in the *Ben cao shi yi* 本草拾遺⁵⁴⁸ (c. +739), thinks that the term covers two realities: on the one hand, large black plants that grow in shallow water, which are called *ma wei zao* 馬尾藻, 'horsetail aquatic grasses', so called because they resemble short horsetails; on the other hand, the *da ye zao* 大葉藻, 'aquatic grasses with large leaves', that grow in deep water. Their leaves resemble those of freshwater aquatic

⁵⁴⁰ See anon., *Ci yuan* (1979–84, p. 2233). ⁵⁴¹ See Mou Qiyu and Qiu Zeqi (1990, pp. 70–1).

⁵⁴² *Allium tuberosum* Rottler ex Spreng., *jiu* 韭. The height is therefore less than thirty centimetres.

⁵⁴³ The expression *shi fa*, 'hair on stones', thus had a generic sense. For example, Li Shizhen (1975–81, p. 1405) mentions it as a synonym of *zhi li* (see below, *zhi li*; the translation of the passage in Bretschneider (1893, no 206). As for the possible consumption of eelgrass, it is attested in Japan; see Tanaka (1976, p. 788).

⁵⁴⁴ See Ding Fubao (1928, 265b).

⁵⁴⁵ *Ligusticum wallichii* Franch. (anon. 1977b, Fig. 0452). In the past, botanists classed it as a distinct species, *Comioselinum unvittatum* Turcz.; Jia Zuzhang and Jia Zushan (1955, Fig. 560).

⁵⁴⁶ Bretschneider (1893, no 197).

⁵⁴⁷ Tang Shenwei (1957, p. 221; 1970, p. 246).

⁵⁴⁸ See SCC Volume 6, Part 1, p. 275.

grasses, *shui zao* 水藻, but are larger. The text of the *Ben cao 'tu jing* (+1062) further notes that these also grow along the coasts of what is now Shandong. It adds that both kinds mentioned by Lu Ji are edible after being steamed and that they also serve as staple foodstuffs in times of famine. It provides an interesting description:

today what are called *hai zao* 海藻 [aquatic sea grasses] are what, in the sea, produce roots that adhere to the surfaces of rocks that lie on the seabed. They are black in colour and resemble loose hair but are slightly thicker.

Adhesion of the roots to rocks on the seabed proves that these are algae, not marine grasses. The text also notes that those with leaves that belong to the category of 'aquatic grasses', *zao*, but are thicker, are called 'algae with large leaves', *da ye zao*. They are gathered by divers. With a rope tied round their waists, the divers go down to cut them and twist them round the rope. On the basis of Tao Hongjing's information, the text goes on to identify what the *Er ya* calls *lun*, 'ropes', and *zu*, 'ribbons'. 'Today, the *qing tai* 青苔 and *zi cai* 紫菜 resemble "ropes" and *kun bu* 昆布 resemble "ribbons"'. The latter remark makes it possible to identify *kun bu* as kelp.⁵⁴⁹ Although today *zi cai* designates *Porphyra*,⁵⁵⁰ the description 'ropes' that is applied to these algae inclines me to settle for another species, nowadays known as *man zao* 蔓藻,⁵⁵¹ 'rambling seaweed (algae)' that has no offshoots, is brown in colour and may grow to a length of three metres. Both are species that are edible and are indeed consumed. It seems that we can take it that ever since the 11th century the term *zao* has always designated aquatic plants as a whole, and this corresponds to its original meaning. However, within this general group a distinction is drawn between the *shui zao* on the one hand and the *hai zao* on the other. The plants in the first of these two subsidiary groups are aquatic plants that grow in fresh water and damp places, where the plants that predominate are not algae but more evolved plants, mosses and *Hepatica* (liverwort), whereas the plants in the second sub-group, which are marine aquatic plants, are almost all algae. The characteristic that makes it possible to identify them is that their roots fix directly onto the surface of rocks on the seabed.

(ii) *Algae*

Using Li Shizhen's text, I shall now devote myself exclusively to algae. Li Shizhen does not recognise a specific category for these plants, nor does he provide precise descriptions of them. Algae are to be found in three of his categories. In *juan* 19, *shui cao lei* 水草類, the category of aquatic grasses, Li Shizhen introduces the term *shui zao* 水藻 as an entry.⁵⁵² He defines *zao* 藻, 'algae', as 'those of the aquatic grasses (*shui cao* 水草) adorned with impressions', and he notes that there are two kinds of these, the *shui zao* 水草, '[fresh]water algae', with leaves growing opposite each

⁵⁴⁹ *Laminaria japonica* Aresch. Nevertheless, Kitamura Shiro (1985, pp. 305–6) mentions other possible identifications for *kun bu*, *Undaria pinnatifida* (Harvey) Suringar and *Ecklonia kurume* Okamura.

⁵⁵⁰ *Porphyra tenera* Kjellm.; Jia Zuzhang and Jia Zushan (1955, Fig. 2362).

⁵⁵¹ *Chorda filum* Lamour.; Jia Zuzhang and Jia Zushan (1955, Fig. 2381).

⁵⁵² Li Shizhen (1975–81, pp. 1373–4).

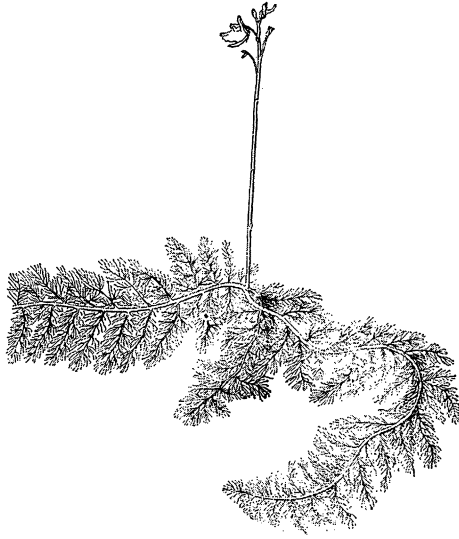


Fig. 131. *Utricularia vulgaris*, in Wang Ningzhu et al. (1983, Fig. 308, p. 617).

other, which are two or three inches long, and are also called *ma zao* 馬藻, ‘thick algae’, and *ju zao* 聚藻, ‘algae in clumps’, with very delicate leaves like silk threads that resemble the gills of fish and are grouped together regularly at the nodes on the stems. These are the *shui wen* 水蘊, ‘water wen’, also commonly known as *sai cao* 鰓草, ‘gill grasses’, or *niu wei wen* 牛尾蘊, ‘cow-tail wen’. The comparison with gills encourages me to regard these plants as utricular⁵⁵³ or as limnophiles.⁵⁵⁴ The bipinnate leaves of the former, which are very delicate, do indeed look like fish gills (Fig. 131), and the comparison is also possible for the leaf-bearing stems of the latter (Fig. 132). The next entry is *hai zao* 海藻, ‘sea algae’, a term that a citation from Su Song defines as ‘those of the *shui zao* [water algae] that are in the sea’.⁵⁵⁵ Li Shizhen goes on to say that these are gathered everywhere along the seashore and that they are *hai cai* 海菜, ‘sea vegetables’. Two synonyms are mentioned, *luo shou* 落首 and *hai luo* 海蘿. *Hai zao* certainly has a generic meaning that covers various ‘sea salads’, such as porphyries, *Ulva*, *Sargassum* and so on. Next come three other names of marine algae. Li Shizhen compares the first, *hai wen* 海蘊, to a hank of entangled silk.⁵⁵⁶ The next two are flat and long and are compared to bands. The names also no doubt have generic meanings, for various species of laminary and zoostere can

⁵⁵³ *Utricularia vulgaris* L., in Wang Ningzhu et al. (1983, p. 616).

⁵⁵⁴ For example, *Limnophila sessiliflora* (Vahl.) Blume; see Wang Ningzhu et al. (1983, p. 594).

⁵⁵⁵ Li Shizhen (1975–81, p. 1374).

⁵⁵⁶ No doubt *Nemacystis decipiens* (Suringar) Kuckuck; see Chihara (1981, Plate 16, no 3, p. 31); Makino Tomitaro (1981, p. 932, no 3725).



Fig. 132. *Laminophila sessiliflora*, in Wang Ningzhu et al. (1983, Fig. 297, p. 595).

be identified under *hai dai* 海帶⁵⁵⁷ and *kun bu* 昆布.⁵⁵⁸ The next entry, *Yue wang yu suan* 越王余算, designates a sea pen that Li Shizhen assimilates to a plant but that belongs to the animal kingdom.⁵⁵⁹ This is followed by a coral, *shi fan* 石帆, 'veil of stone'.⁵⁶⁰ The category of aquatic grasses ends with a new alga, *shui song* 水松, 'aquatic pine'.⁵⁶¹ The first entry in the category of 'mosses and allied plants', *tai lei* 苔類 (*juan* 21), is *zhi li* 陟厘. Li Shizhen points out that this term designates two distinct aquatic plants, one of which grows fixed to rocks, in clumps, while the other 'grows by itself' without being fixed to the rocks. The former is identified as freshwater algae of the *Spirogyra* and *Zygnema* genera; the latter, commonly called 'water swallow-wort', *shui mian* 水綿, designates a phycobacterium that grows in troubled waters, *Sphaerotilus natans* Kutring.⁵⁶² The other plants cited in this category are mosses, lichens and another bacterium.

⁵⁵⁷ Read (1936, Fig. 862) identifies the term with two species, *Laminaria japonica* Aresch. and *Laminaria saccharina* L. Kitamura Shiro (1985, p. 305) confirms the first identification and also suggests *Zostera marina* L.

⁵⁵⁸ *Laminaria japonica* Aresch., according to Kitamura Shiro (1985, pp. 305–6).

⁵⁵⁹ Kitamura Shiro (1985, p. 306) indicates precisely *Virgularia gustaviana* (Herklots).

⁵⁶⁰ *Gorgonia flabellum* L., according to Kitamura Shiro (1985, p. 307).

⁵⁶¹ *Codium fragile* (Suringar) Hariot., according to Kitamura Shiro (1985, p. 307).

⁵⁶² According to Kitamura Shiro (1985, p. 318).

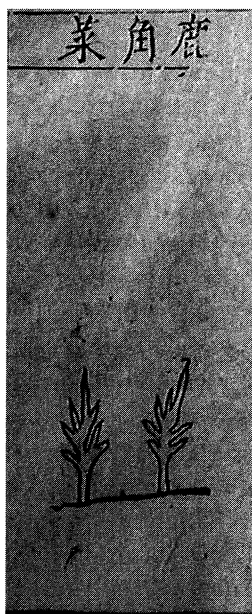


Fig. 133. *Lu jiao cai* 鹿角菜, in the first edition of *Ben cao gang mu* (1596, *cai bu tu juan zhi shang, shui cai lei fu tu* 菜部圖卷之上水菜類附圖 57a). Cf Li Shizhen (1975–81, Volume 3, *fu tu*, p. 31).

A number of different algae are to be found in the category of ‘aquatic vegetables’, *shui cai lei* 水菜類 (*juan* 28). Those cited are, successively, a red alga, *zi cai* 紫菜,⁵⁶³ a ‘purple vegetable’; a green alga, *shi chun* 石莼,⁵⁶⁴ ‘rock bransenia’; three red algae, *shi hua cai*, 石花菜,⁵⁶⁵ ‘rock flower vegetable’; *lu jiao cai* 鹿角菜 (Figs. 133, 134),⁵⁶⁶ ‘deer horn vegetable’; and *long xu cai* 龍鬚菜,⁵⁶⁷ ‘dragon’s beard vegetable’. The last plant, called *shui cai* 睡菜, is not represented in the *Ben cao gang mu*. This is not an alga but a gentianacea, the buckbean.⁵⁶⁸

It is noticeable that even in this category dominated by algae, Li Shizhen includes a plant that grows in marshes but possesses a stem and aerial leaves, with clusters of fine flowers that rule out considering it an alga. It is clear that he does not group together in a single category all the algae that are mentioned in the *Ben cao gang mu*,

⁵⁶³ *Porphyra tenera* Kjellman, in Jia Zuzhang and Jia Zushan (1955, Fig. 2362); Kitamura Shiro (1985, p. 404).

⁵⁶⁴ *Ulva pertusa* Kjellman, in Jia Zuzhang and Jia Zushan (1955, Fig. 2398); Makino Tomitaro (1970, no 3703, p. 926).

⁵⁶⁵ The Chinese name certainly has a generic sense, identifiable as *Gelidium* (Jia Zuzhang and Jia Zushan 1955, pp. 1384–5; Read 1936, Fig. 861; Kitamura Shiro 1985, p. 405; Tanaka, Ono 1891, no 159).

⁵⁶⁶ Two identifications are given for this Chinese name, *Chondrus ocellatus* Holmes (Jia Zuzhang and Jia Zushan (1955, Fig. 2345), as well as most authors), and *Gloiopeltis furcata* Postels et Ruprecht (Kitamura Shiro 1985, p. 405). I incline toward the first identification, limiting myself to the genus name, as is suggested by a comparison between the illustrations in various editions of the *Ben cao gang mu* containing representations of algae (Fig. 133).

⁵⁶⁷ *Gracilaria* spp. Two names of species are given: *G. verrucosa* (Hurd.) Papenf. (anon. 1977b, Fig. 1294) and *G. compressa* (Agardh) Greville (Kitamura Shiro 1985, p. 405).

⁵⁶⁸ *Menyanthes trifoliata* L.; Jia Zuzhang and Jia Zushan (1955, Fig. 0439).

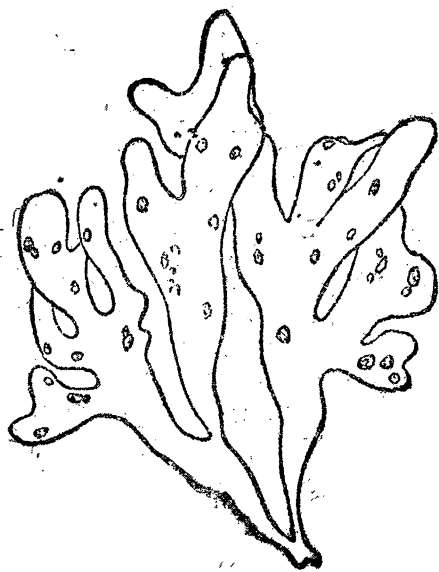
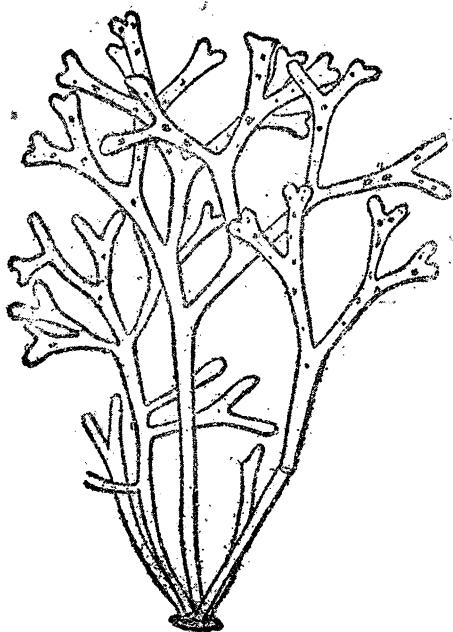
***Chondrus ocellatus* Holmes.*****Chondrus elatus* Holmes.**

Fig. 134. Possible identification of *lu jiao cai* as a species of *Chondrus*, considering Jia Zuzhang and Jia Zushan (1955, p. 1379, Figs. 2344 and 2345).

as he does for the mosses and *Hepatica*. In the categories labelled 'aquatic vegetables' and 'aquatic grasses' that include several plants today identified as algae, it is interesting to note that their names are nevertheless all eventually cited. This suggests that we might postulate an implicit recognition of a grouping-together that is similar to that used for certain groups of plants that represent covert categories or even submerged families.⁵⁶⁹ It thus seems that Li Shizhen did recognise algae as a folk category yet did not treat them as a subject for particular consideration that would lead him to distinguish them formally in the classification that he proposes for *materia medica*. His interest in them relates solely to their use as medicines or as food. So in this sense it is not possible to credit any algology or phycology to Li Shizhen.

(5) FUNGI

樂出虛蒸成菌

Happiness comes from the void, evaporation produces mushrooms

Zhuang Zi

⁵⁶⁹ See pp. 7–8, 82–5, 96, 658.

(i) *Prologue*

Knowledge about mushrooms is the last of the three particular themes that Joseph Needham wished to see developed separately. This field of knowledge in ancient China is still very little explored and the gap that I have noticed between mycology as a modern science and ancient knowledge does not make things any easier, in particular when it comes to identifying names. The difficulty of recognising in an ancient term the species that it designates stems from the fact that there is hardly any correspondence between the names of mushrooms that appear in the ancient texts and contemporary mycological nomenclature. This point is appreciably different from the situation with the more evolved plants. For the plants known in ancient times, a large number of ancient Chinese names have been taken over by botanists from those that appear in works devoted to plants, whether these are pharmacopoeias, which of course include in the front rank Li Shizhen's 李時珍 *Bencao gang mu* (1596), horticultural treatises such as the *Qun fang pu* 群芳譜 (1620) by Wang Xiangjin 王象晉 or treatises of 'traditional botany' such as the *Zhi wu ming shi tu kao* 植物名實圖考 (1848) by Wu Qijun 吳其濬. It will therefore be understood, I hope, that even if I have considered it useful to try to identify as far as possible which are the mushrooms mentioned in the sources that I have used, I make no claims that my work has completely resolved the problem. Readers should therefore consider the lexicon given in the second part of this section to be of a tentative nature rather than a definitive proposition. Anyone who knows how difficult it may be to recognise mushrooms of particular species – russulas, for instance – even with a specimen available, will appreciate the degree of guesswork that is involved when, as sometimes happens, the characteristics described in the texts are extremely approximate. It is therefore with great interest that I shall read any remarks, criticisms and suggestions that may be addressed to me and I should like to thank my readers in advance for such help and at the same time express my gratitude to one of my two anonymous referees for his greatly valued comments.

(ii) *Sources*

In all the Chinese literature that is devoted to plants, four treatises specifically concern mushrooms, not to mention various parts of works of *materia medica* and certain entries in texts of an encyclopaedic nature. As Joseph Needham commented in 1975 in a letter to G. C. Ainsworth, the author of an *Introduction to the History of Mycology*, at that time very little had been written on the subject where China was concerned.⁵⁷⁰ Today that situation has already changed. What I propose to present here is not a history, but a glimpse of a history, of the knowledge about mushrooms

⁵⁷⁰ Before this date, two articles presenting a historical view had been published in China on this subject (Liu Bo 1958a, 1958b). Since then, at least one article has described the origin of the cultivation of mushrooms (Chen Shiyu 1983) and a very well-documented book has been devoted exclusively to the history of the cultivation of 'perfumed mushrooms', *xiang gu* 香菇 (*Lentinus edodes* (Berlk.) Sing.); see Zhang Shoucheng and Lai Minnan (1993).

that can be obtained from what the Chinese sources tell us. Proceeding chronologically, I shall start by returning to the text of the *Er ya*.

Among the epiphytes, I have already mentioned the name of the first mushroom that I interpreted to be a parasite on *Zizania* (Indian rice) plants. We should remember simply that Guo Pu's commentary on the subject of this *chu sui* 出隧 indicated that it 'resembles an earth mushroom', *tu jun* 土菌. In that same Chapter 13, 'Explaining Grasses', 'Shih cao' 釋草, other mushrooms are also mentioned. The entry⁵⁷¹ *zhong kui* 鍾馗⁵⁷² is defined by *jun* 菌, 'mushroom', and is followed by 'xiao zhe jun' 小者菌, 'the small ones are *jun*'.⁵⁷³ Guo Pu comments on the first statement as follows: 'it is a mushroom of the earth (*di xun ye* 地蕈也); it resembles a canopy (*si gai* 似蓋). These days the people of Jiangdong call it an earth mushroom (*tu jun* 土菌) or else *kui* 馗. It is an edible mushroom'. Guo Pu's comment on the second statement is simply 'depending on the size, the names are different'. Now let us refer to the *Shuo wen jie zi* 說文解字 and try to pin down the meanings of the various terms that have been encountered and that appear from the context to be used generically. The definition given for *jun* 菌, '*di xun* 地蕈',⁵⁷⁴ 'earth *xun*', refers to a second term that is used generically, *xun* 蕈, which is defined as '*sang juan* 桑蕈' 'juan of the mulberry tree'.⁵⁷⁵ This definition suggests that we should investigate the meaning of '*juan*', a term that also appears as a dictionary entry with the meaning of '*mu er* 木耳', 'ear of a tree'.⁵⁷⁶ It thus seems that two fundamental categories of mushroom based on the place where they grow are clearly attested in +121, the date when the *Shuo wen jie zi* was presented to the throne: those that grow from the earth are distinguished from those that grow on trees.⁵⁷⁷ Among the former group, two names distinguished by size are given in the *Er ya*: *jun* 菌 designates all small mushrooms and *zhong kui* 鍾馗 designates large edible ones (Fig. 135). But Bretschneider suggests that these are probably agarics (toadstools).⁵⁷⁸ As for the mushrooms that grow on trees, the general term ought to be *juan* 蕈, for that would be the logical deduction to draw from the definitions just cited; however, it is in fact *xun* 蕈 that seems to fill this role. To sum up, *jun* designates mushrooms of a 'normal' size that grow from the earth, while *xun* designates those that grow on trees. Indeed, a commentary on the *Shuo wen jie zi* by Duan Yucai,⁵⁷⁹ when mentioning *xun*, states that 'the *juan* that grow on mulberry trees are called *xun* and the *xun* that grow in the fields are called *jun*'. This remark suggests that the term *xun* should, after all, be considered the general term for designating mushrooms whether they grow from the earth or on trees. Another term, *zhi* 芝, which nowadays also designates a kind of mushroom, does appear in the *Er ya*, but as a synonym for another character, *xiu* 苴, which has now fallen out of use. Nevertheless, Guo Pu's comment, 'The *zhi* flowers three times a year and is a grass that is a good omen',⁵⁸⁰ and also the

⁵⁷¹ See above, p. 356.

⁵⁷² Bretschneider (1893, no 161). See below for a possible identification of this mushroom.

⁵⁷³ Bretschneider (1893, no 162).

⁵⁷⁴ Ding Fubao (1928, p. 358a).

⁵⁷⁵ Ding Fubao (1928, p. 358b).

⁵⁷⁶ Ding Fubao (1928, p. 359a).

⁵⁷⁷ Boltz (1993c, p. 429).

⁵⁷⁸ Bretschneider (1893, no 162).

⁵⁷⁹ Ding Fubao (1928, p. 358b).

⁵⁸⁰ Bretschneider (1893, no 41, p. 40).



Fig. 135. *Zhong kui* 中馗, from *Er ya tu* (1883, *juan xia qian*, 19a). A big fungus, possibly a sarcodon.

definition in the *Shuo wen jie zi*, 'grass of the gods', *shen cao* 神草,⁵⁸¹ lead one to wonder whether it really means 'mushroom' or refers to another plant that flowers. The mention in the *Shen nong ben cao jing* 神農本草經 of six kinds of *zhi*, distinguished by their colours, among products of the higher rank (*shang pin* 上品) and identifiable from later texts as mushrooms of the *Ganoderma* genus leaves no room for doubt.⁵⁸² Nevertheless, given that in the earliest texts that mention the *zhi* there is no reference to the other categories just cited, it seems likely that up until the time of the eastern Jin (+317–+420) *zhi* were considered to be a third, distinct, category of mushrooms.⁵⁸³ I shall begin by analysing the case of the *zhi* since they occupy a very particular place in all the literature devoted to mushrooms. Four chapters (*juan* 48–51) in the 'Cao mu dian' section devoted to plants in the great encyclopaedia *Gu jin tu shu ji cheng* 古今圖書集成⁵⁸⁴ (+1726) record nothing but citations relating to *zhi*, whereas those concerning *jun* and *mu er* are all to be found in the following chapter (*juan* 52). In the first part, *hui kao* 彙考, which is of a rather 'technical' nature, there are references to eighteen titles; extracts from the literary texts of fifty-six authors are cited in the next two parts, *yi wen* 藝文, and in the last part, under the rubric 'recorded facts', *ji shi* 紀事, 219 cases of the appearance of *zhi*,

⁵⁸¹ Ding Fubao (1928, p. 237a).

⁵⁸² Cited in the *Zheng lei ben cao* (Tang Shenwei 1957, p. 168).

⁵⁸³ This view is shared by Chen Shiyu (1991, p. 70).

⁵⁸⁴ See pp. 111–12 above.

mushrooms, in various parts of the empire and in different periods are recorded. All these figures seem to me to indicate the importance of this plant in the history of China. That importance is also reflected by another remarkable collection of citations from Chinese texts relating to animals, plants and minerals, produced in Japan between 1699 and 1747 by Ino Jakusui 稻生若水 (+1655–+1715) and Niwa Shôhaku 丹羽正伯 (+1691–+1756), the *Shobutsu rui san* 庶物類纂 (Collection by Categories of Things). The passages relating to *zhi* represent 40 per cent of the 359 pages devoted to mushrooms. The 108 texts that are cited as references testify to the cultural importance of these ‘things’ and, in this collection, the extracts from forty-two local monographs certainly testify to the interest attached to their appearance, which, like that of other exceptional plants, could be interpreted as proof of the virtue of the prince and would be duly noted.

Now let us consider the nature of the information that these anthologies contain. Let us start with the local monographs from which extracts are recorded under the title ‘recorded facts’ in the Chinese encyclopaedia and which are simply indicated by their titles in the Japanese collection. The most numerous ones are the fruit of direct observations. The texts are very brief, on the model of ‘in such or such a year in such or such a place, there appeared one – or several – *zhi* (mushrooms) with so many stems’. The monograph from the canton of Zichuan 淄川 in present-day Shandong tells us, for example,

In the autumn of the year *jia wu* 甲午 of the Shun Zhi 順治 period [1654], to the east of the Nan Diao Qiao property, *ling zhi* 靈芝 grew on several *mu* 畝.⁵⁸⁵ They were purple in colour and shiny, as if lacquered. The inhabitants wrongly took them to be mushrooms (*jun*) and picked them. But they could not eat them because they were leathery.⁵⁸⁶

The *Tu shu ji cheng* contains dated and localised mentions of some 220 cases of the appearance of one or several *zhi* reported in dynastic stories or local monographs.⁵⁸⁷ Alongside such precise and factual details, we also find general information culled from other texts. Yet another group of references is formed precisely by texts about the nature of the *zhi*. These are ‘brush-stroke notes’, *sui bi* 隨筆, such as the *You yang za zu* 酉陽雜俎 (c.+860) by Duan Chengshi 段成式; extracts from works on *materia medica*, in particular Li Shizhen’s *Ben cao gang mu* (+1596); the *Shi wu ben cao* 食物本草,⁵⁸⁸ and horticultural treatises. Upon reading these various texts, it becomes apparent that the term *zhi* covers two distinct aspects, on the one hand a natural object, a mushroom – of the *Ganoderma* genus – considered to be a good omen and also included in *materia medica*, and on the other a symbolic object, not necessarily a

⁵⁸⁵ One *mu* corresponds to a surface area of one-fifteenth of a hectare.

⁵⁸⁶ *Shou Butsu Rui San, jun shu*, *juan* 3, 12b. ⁵⁸⁷ *Gu jin tu shu ji cheng*, Chapter 51, pp. 38–40.

⁵⁸⁸ Several works by different authors exist under the title ‘*materia medica* of foodstuffs’. The *Shi wu ben cao* by Lu He 盧和, published between 1573 and 1619, has four (or two) *juan*. Its contents are identical to those of *juan* 3 and 4 of the *Ben cao yao yan* 本草藥言 by Bi Ji 薛己. The year 1620 saw the publication, under the same title, of another work in seven *juan*, composed by Wang Ying 汪穎. The most important, though, is the next work, completed after 1641. On the basis of a compilation produced by Li Gao 李杲 under the Yuan dynasty, Li Shizhen revised and completed a text that was further enriched and edited by Yao Gecheng 姚可成 after 1641 (anon. 1981, p. 185). For a recent edition, see Li Gao, Li Shizhen and Yao Kecheng (1990).

plant, which is closely linked with the quest for longevity, or even immortality. It is not always easy to disentangle these two aspects. However a number of texts devoted specifically to *zhi* should make it possible to be precise about the nature of these objects. An interesting passage may be found in *juan 11* of the *Bao pu zi nei pian* 抱朴子內篇 by Ge Hong 葛洪 (+283–+363).⁵⁸⁹

Noting the properties of the three categories of drugs in the *Shen nong ben cao jing*, the text first cites the ‘Five *zhi*’ in the category of top-rank drugs, *shang yao* 上藥, the absorption of which ‘allows humans to fly and to be immortal’. Further on, the text indicates that these are the Five *zhi*, the *zhi* of stone, *shi zhi* 石芝; the *zhi* of wood, *mu zhi* 木芝; the *zhi* of grass, *cao zhi* 草芝; the *zhi* of flesh, *rou zhi* 肉芝; and the mushroom, *jun zhi* 菌芝. The text states that each of these categories includes a hundred different kinds. The ‘stone *zhi*’ are *zhi* that resemble stones and grow in the famous mountains close to the sea and also on the shores of islands. Those that are made up of heaped-up stones resemble elephants, with a head, a tail and four feet, exactly like living beings. They are of various colours, vermilion like coral, white like fat, black like lacquer, blue-green like the wing of a kingfisher, yellow like gold, and all are shiny. At night they are visible from a distance of 300 paces. The larger ones weigh over ten pounds, the small ones three or four pounds. They are visible only to those who walk in the mountains and carry various talismans. Then comes a description of a number of them which, when absorbed, generally allow one to live for a thousand years. The *zhi* of wood are described as follows:

the grease of pines and cypresses penetrates into the ground for a thousand years, [then] is transformed into *fu ling* 茯苓⁵⁹⁰ and, after ten thousand years, above the *fu ling* there grows a little tree shaped like the flower of a lotus which is called *mu wei xi zhi* 木威喜芝 [tree of supreme happiness *zhi*],⁵⁹¹

which shines in the night and, after a particular process of gathering it and preparing it, makes it possible for the specialist to live for three thousand years. It should be remembered that the *fu ling* is not considered to be a mushroom but is classed by Li Shizhen, along with two other mushrooms called *zhu ling* 豬苓 and *lei wan* 雷丸, in the trees section under the category of ‘wood parasites’. It is noticeable that at no point does the text reveal that they are perceived to be mushrooms even though the way they grow, which is described, is very similar.⁵⁹² The blood emitted from another wood *zhi*, formed from a section of dead tree root that is a thousand years old and is shaped like a seated human being, makes it possible, when daubed on the soles of the feet, to walk on water; when daubed on the nose, to penetrate water; when spread on to the body, it makes one’s shadow invisible; finally, when ingested, it confers one thousand years of life. The large ten-pound excrescences in

⁵⁸⁹ See Wang Ming (1985, pp. 196–210). See Feifel (1946) for an English translation. For a French translation by Philippe Che, see Ge Hong (1999).

⁵⁹⁰ *Poria cocos* (Schw.) Wolf, known as Indian bread or tuckahoe. As we have seen, p. 272, this mushroom was supposed to be related to the dodder.

⁵⁹¹ Wang Ming (1985, p. 199). ⁵⁹² See the ‘Epiphytes’ chapter.

the shape of a dragon that appear on the branches of pines that are three thousand years old, when reduced to powder and swallowed, eventually bestow five hundred years of life. In all there are 120 kinds of these wood *zhi*, *mu zhi* 木芝. Among the grass *zhi*, *cao zhi* 草芝, the first cited is the *du yao zhi* 獨搖芝, 'the *zhi* that moves by itself'. It stirs when there is no wind. Its stem is the size of a finger and is red in colour, and its leaves resemble those of the amaranth. The root is formed of a large bushel-like tuber surrounded by twelve small roots shaped like hens' eggs which themselves have delicate roots like white hairs. It is to be found in high mountain ravines in places devoid of other vegetation. Ingestion of the large tuber when reduced to powder confers longevity of a thousand years, whereas the smaller ones confer only a hundred years. There are also 120 kinds of these grass *zhi* which, when absorbed after being dried, confer longevity of between a thousand and two thousand years. There are also 120 kinds of flesh *zhi*, *rou zhi* 肉芝, such as a 'ten-thousand-year-old toad', *wan sui chan chu* 萬歲蟾蜍, with a horn on its head. One culls it on the fifth day of the fifth month and leaves it to dry out in the shade for 100 days. When reduced to powder and absorbed, it confers forty thousand years of longevity. The *zhi* mushrooms, *jun zhi* 菌芝, finally, also come in 120 kinds. They grow deep in the mountains, under the trees or close to springs. They come in five colours, and are of a variety of shapes, such as a house, a carriage, a horse, a dragon, a tiger, a human being or a bird in flight. After being gathered using a bone knife, dried in the shade and reduced to a powder, these *zhi* mushrooms can be absorbed. The best ones allow human beings to become genies that live for several thousands of years; those of inferior quality bestow longevity of only a thousand years.

One concludes from the above that these various categories designate extraordinary objects of many kinds, all of which, when ingested following a particular preparation, procure great, or extremely great, longevity. As for their physical properties, many of them take very unexpected shapes, some are luminescent and all are to be found only in very out-of-the-way places. It is worth noting that luminescence is a characteristic of some real mushrooms,⁵⁹³ but I shall now close my investigations into all these magic *zhi* apart from those whose names suggest that they belong to the real plant domain.

There is one undated text that gives a more precise idea of the nature of the 'grass *zhi*': the *Tai shang ling bao zhi cao pin* 太上靈寶芝草品 (Catalogue of *Zhi* Grasses from the Sacred Treasure of the On-High).⁵⁹⁴ We know neither the author nor the date of composition of this text, which is illustrated and consists of one *juan*.

⁵⁹³ Roger Heim (1969, pp. 122) points out that some mushrooms emit a bluish or greenish light in the dark. They are Hymenocetes 'that belong mainly to the *Pleurotus*, *Mycena*, *Poromyces*, *Dictyopanus* and *Clitocybe* genera, possibly also to Polypores and even to Phalloides, most of which are to be found in the tropics, particularly Oceania . . . , Asia, South America and the Far East'. The author goes on to explain that 'the radiations peculiar to this luminescence . . . imply the nature of a light very close to that emitted by fireflies, and [that] this emission is strong enough to mark a photographic plate'.

⁵⁹⁴ My thanks go to John Lagerway for his friendly advice on a number of points in this chapter. I also salute the memory of Michel Strickmann, who, one day in November 1971, brought this text to my notice.

It is part of the Daoist Canon.⁵⁹⁵ With the aid of 127 illustrations, each accompanied by a short text, it describes as many plants, most of which resemble mushrooms. All the names are terms derived from the morpheme *zhi*. So this may be considered a monograph on the *zhi*. Tiziana Lippiello has published a translation preceded by an introduction.⁵⁹⁶ Her book is also precious for its iconography, for it reproduces the pages of the original in facsimile and this enables the reader to appreciate the diversity and strangeness of these magic mushrooms. On the basis of the illustrations and their morphology, I propose to divide these plants into a number of groups that give some idea of the variety of the models. Type 1 has one cap and one foot; type 2, 'with several levels', has several caps and a single foot; type 3 is the shape of a chandelier, with a branching stem with two, three or five caps; type 4 has several stems; type 5 has multiple subjects; and type 6 is anthropomorphic. Following the example of George Luis Borges,⁵⁹⁷ I am also adding an 'et cetera' type that corresponds exactly to the *za* 雜, 'varia', of some sections of Li Shizhen's *Ben cao gang mu*. I have placed under this title many extraordinary objects shaped like Chinese characters, in the form of snakes, with parallelipedic caps, in the form of flames or the lotus or with two intertwining stems and so on. It is also clear that most of these 'mushrooms' are associated with human beings or animals (usually tigers or buffaloes), trees, mountains or even clouds.

Now let us consider the text. The short passage that serves as an introduction immediately confirms the importance of the ingestion of drugs designed to lengthen life and it places the work in a Daoist context. The text explains that, faced with the great number of mushrooms that exist, illustrations and descriptions designed to make them recognisable are there so as to help the reader to 'attain to the way of the genies'. So this work is not what might today be called a guide to mushrooms for the use of mycologists or for mushroom enthusiasts. Rather it is an esoteric treatise for specialists seeking immortality. The descriptions confirm this point immediately. Thus 'the jade mushroom of the White Emperor',⁵⁹⁸ *bai di yu zhi* 白帝玉芝, 'grows among the heaps of stones on the shady sides of famous mountains. White canopy, dark green stem, black interior, and a sweet taste. To eat it makes it possible to live for three thousand years like a genie' (Fig. 136). The 'mushroom of the north', *bei fang zhi* 北方芝,

grows on the shady sides of famous mountains. It has three canopies and black stems that grow close together. Its taste is deliciously sweet. One eats it and becomes a genie able to live in water, never grow weak or old and live 80,000 years. A black bovine guards it (Fig. 137).

As for the 'mushroom of the white cloud' (*bai yun zhi* 白雲芝), round like a drum, it has five colours. At the top it has six vermilion seeds. Its stem is also vermilion. It has

⁵⁹⁵ Anon. (1923, Fascicule 1051, pp. 1a–64b). ⁵⁹⁶ Lippiello (2007).

⁵⁹⁷ In *La langue analytique de John Wilkins*, Borges (1993, p. 749). ⁵⁹⁸ Lippiello (2007, p. 100).



Fig. 136. *Bai di yu zhi* 白帝玉芝, 'jade mushroom of White Emperor', from *Tai shang ling bao zhi cao pin* (6a).



Fig. 137. *Bei fang zhi* 北方芝, 'mushroom of the north', from *Tai shang ling bao zhi cao pin* (9a).



Fig. 138. *Bai yun zhi* 白雲芝, 'mushroom of the white cloud', from *Tai shang ling bao zhi cao pin* (29b).

an acid taste and if one eats it one becomes a genie for ten thousand years' (Fig. 138). The mushroom of the essence of springtime, *chun jing zhi* 春精芝,

has an inverted canopy, coloured green and vermillion. Above, it has horns on top of which there are two hanging seeds. Its taste is bitter. Gather it with a bronze knife. The period when one eats it and in what quantities matters little, 30,000 years. It is covered by a cloud of five colours [Fig. 139].

Even if thorough comprehension of such a text, and also of the *Bao pu zi*, can be attained only with intellectual tools that make it possible to decipher the keys to its esotericism, it nevertheless seems to me that it testifies to a degree of observation of the diversity of the forms offered by the world of cryptogams and also to a fine imagination. Whereas the texts cited previously rapidly testified to a distinction between mushrooms growing on the ground and mushrooms growing on trees, this treatise mentions only mushrooms of the first type, yet it is remarkable that the two generic terms that I defined earlier, namely *jun* 菌 and *xun* 蕈, never appear at all in this text in which all the mushrooms cited are *zhi* 芝. The images of numerous mushrooms with canopies and stems, in other words a cap and a foot, some single, others multiple, may evoke marasmas, inocybes, coprins or hypholomes (Fig. 140).



Fig. 139. *Chun jing zhi* 春精芝, 'mushroom of the essence of springtime', from *Tai shang ling bao zhi cao pin* (27a).

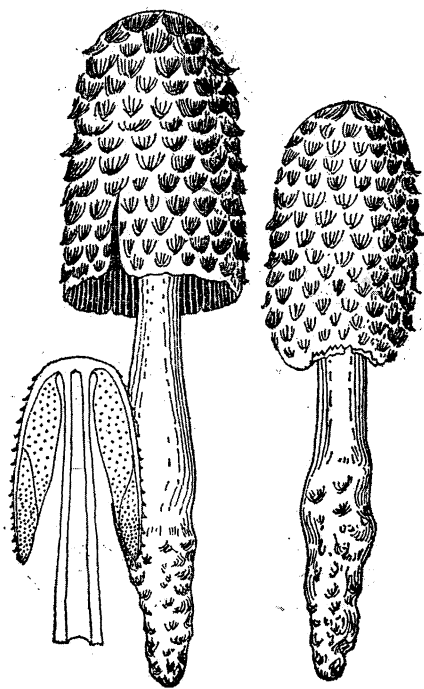


Fig. 140. A coprin, *Coprinus comatus* (Mull. ex Fr.) Gray, from Zhang Guangya (1984, p. 189).



Fig. 141. Example of a mushroom looking like a snake, another mushroom of the north, *bei fang zhi* 北方芝, from *Tai shang ling bao zhi cao pin* (22a).

However, some extraordinary forms, 'with several levels' or 'like chandeliers', seem, in illustration, hard to assimilate to biological realities, while certain 'snakes' (Fig. 141) may very well be compared to club-topped mushrooms or to satyr butterflies (*Phallus sp.*). However, leaving this problem open, I shall not pursue my speculations any further but shall now present, chronologically, other monographs that are devoted to real mushrooms.

A good, early record by Luo Yuan 羅願 is to be found in the *Er ya yi* 爾雅翼 (c.1170). In these 'wings' to the *Er ya*, the author produces a synthesis of earlier knowledge. A *zhi* is described as *rui cao* 瑞草, a 'grass of good omen' that grows without a root. It is produced by a harmonious fusion of the earth's *qi* 氣.⁵⁹⁹ Magicians know of six *zhi*, five of which are rare, while the sixth, which is purple, is quite common. All six *zhi* prolong life. Nevertheless, the author remarks, there are not only those six kinds for, according to the *Bao pu zi*, five other categories of *zhi* each include about 100 different kinds, which have just been cited. The complexity of the situation is conveyed by the compiler's comparison of the different definitions. On the basis of a number of writings, he concludes that 'that which lives without

⁵⁹⁹ *Zhi sheng yu tu, tu qi he, gu zhi cao sheng* 芝生於土土氣和故芝草生 (*Shou Butsu Rui San*, 菌屬, *juan* 1, 16a).

flower or leaf is called *zhi er* 芝栢 – that *zhi* 芝 is *mu zhi* 木芝;⁶⁰⁰ that that which has no flower but does produce fruit is called *er* 栢; and that all the *zhi* 芝 belong to the category *zhi er* 芝栢'. To end, he states that *zhi* 芝 and *jun* 菌 are synonymous, *zhi* being an all-encompassing term. At this point it becomes clear that, for this author, the term *zhi* certainly designates a wide category of mushrooms that is identical to what were, until then, designated by *jun*.

Before tackling the difficult task of determining the terms that designate mushrooms, I think it necessary to present the treatises that various authors have, in various periods, devoted to these natural objects that are so unusual.

(iii) *Treatises*

The first non-esoteric treatise, entitled *Jun pu* 菌譜 (Treatise on Mushrooms), which is not illustrated, contains a preface by its author which is dated to the fifth year of the Chun You 淳祐 period (+1245) of the Emperor Li Zong 理宗 of the Southern Song.⁶⁰⁰ The author, Chen Renyu 陳仁玉, *zi* Bilou 碧樓, became *jin shi* during the Kai Qing period (1259). He was a native of Xianju 仙居⁶⁰¹ in the prefecture of Taizhou 台州, which was famous for its mushrooms. The author's preface starts with a definition, 'the mushrooms are all a-budding (*zhuo* 茁) of *qi*; when the flowers of the *ling* appear three times, that is an excellent augury'.⁶⁰² In that statement, I translate the association of the two terms *zhi* and *jun* as 'mushrooms'. This example, like that of the text cited earlier from the *Er ya yi*, certainly attests the biological reality of the plants called *zhi* under the Song and also their cultural importance. As for their flowers, we may reasonably assume that they are the small-sized caps, yellow in colour, that appear at the top of certain *Ganoderma* plants that are said to be 'antler-shaped' (Fig. 142).⁶⁰³ So it is now possible to confirm that the term *zhi* 芝, when it refers to a real mushroom, does, in most cases,⁶⁰⁴ designate mushrooms of the *Ganoderma* genus whose woody appearance and quasi-immunity to rotting have encouraged an association with the idea of immortality, whereas the name *jun* 菌 is applied to mushrooms of a more ephemeral nature. This short treatise includes eleven entries that provide quite detailed information in four cases and very brief descriptions in the seven others. It is noticeable that all the names of these mushrooms are formed on the basis of the morpheme *xun* 蕈. The first cited, *he xun* 合蕈, appears in early spring on trees that have been harmed by an excess of snow in the winter. It is brown in colour, with flesh as pure as jade, and it gives off a mild perfume. Of all the 'mushrooms with canopies', *gai xun* 蓋蕈 – that is to say, possessing a stem and a concave cap – it is the only one that is perfumed. The

⁶⁰⁰ The entire text is cited in the *Zhi wu ming shi tu kao* (1848); see Wu Qijun (1959, pp. 231–3).

⁶⁰¹ See Wang Yuhu (1979, p. 100). Today Xian-ju, in Zhejiang province, to the south of Shanghai.

⁶⁰² The edition of the *Shuo fu*, *juan* 106, ed. Yuan Wei Shan Tang.

⁶⁰³ This 'flowering' should be compared to the appearance of buds of a brownish-yellow colour on *Paulownia* in winter (see above, pp. 349, 442).

⁶⁰⁴ See below, p. 389.

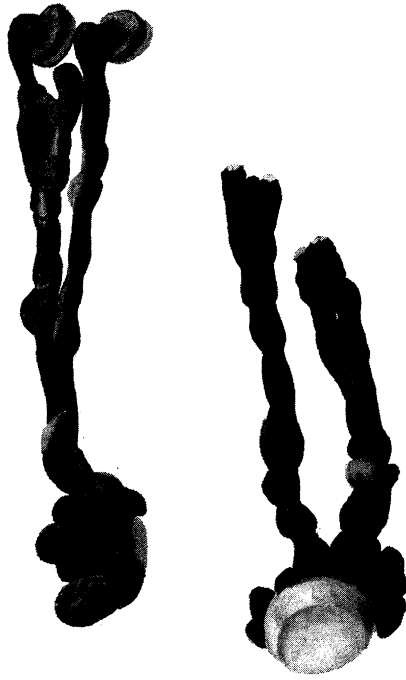


Fig. 142. Antler-shaped *Ganoderma*, from anon. (1978b, Fig. 133, section 1).

author goes on to note that for the past few decades it has been offered as tribute to the emperor. He also states that those that come from places other than the Weiqiang hills to the west of his own town have a longer stem but no perfume. The second entry concerns another mushroom that the author also considers to be native to his own region and that has an excellent taste: the *chou gao xun* 稠膏蕈. This resembles a 'yellow pearl' when it starts to grow, then opens out in the shape of an umbrella. This 'pine mushroom', *song xun* 松蕈, which grows in the shade of pine trees, may be gathered at any time. In the past, it was consumed secretly in the mountains by those seeking immortality. Another entry designates the 'bamboo mushroom', *zhu xun* 竹蕈, which grows from bamboo roots and has an extremely sweet taste. The author points out that although it is often mentioned in treatises relating to bamboo shoots, it really is a mushroom. The 'barley mushroom', *mai xun* 麥蕈, grows in loose, sandy soils bordering streams. It is also known as 'the barley cinnabar mushroom', *mai dan xun* 麥丹蕈. It belongs to the category of 'northern mushrooms', *bei fang mo gu* 北方磨菇, and is the most precious of all mushrooms. The 'jade mushroom', *yu xun* 玉蕈, which grows in early winter, owes its name to its beauty and its pure colour. It is used in soups. This detail of its culinary use is attested by Lin Hong 林洪, a retired scholar who lived in the 13th century, in a very

instructive text about the menus of a hermit, the *Shan jia qing gong* 山家清供 (The Simple Fare of a Mountain-Dweller).⁶⁰⁵ The ‘yellow mushroom’, *huang xun*, grows in groups in the mountains. It is yellowish in colour, is a bit leathery and emits an unpleasant smell. The ‘purple mushroom’, *zi xun* 紫蕈, also grows in the mountains. It is known locally as the ‘purple lucky mushroom’, *zi fu xun* 紫福蕈, and is considered to be of inferior quality. The ‘mushroom of the four seasons’, *si ji xun* 四季蕈, grows in forests under the trees. Although it has a sweet taste, it is leathery, which is probably why it is never classed as a foodstuff. The last to be cited is ‘the goose-fat mushroom’, *e gao xun* 鵝膏蕈. This is what the author reports about it:

It grows high in the mountains and is shaped like a goose egg that eventually opens up like an umbrella. It is very sweet and ‘slippery’ to the taste, does not rot, and is very compact but it grows intermingling with *du xun* 杜蕈 [pear-tree mushrooms].⁶⁰⁶ These *du xun* grow in the soil. It is commonly said that they are produced by the *qi* of maggots and it is fatal to eat them. They are very beautiful but are bad . . . All those who become intoxicated by them are convulsed with uncontrollable laughter. The antidote consists in drinking new bitter tea mixed with a spoonful of alum with some fresh water from the well.⁶⁰⁷

The next text is the *Guang jun pu* 廣菌譜 (Treatise, with Additions, on Mushrooms).⁶⁰⁸ The title suggests that it complements a previous one. The author, Pan Zhiheng 潘之恆, *zi* Jingsheng 景升, was a native of She 歙, in the present-day province of Anhui. In the Jia Jing 嘉靖 period (1522–67) of the Ming, he had administrative duties in Jinling, present-day Nanjing.⁶⁰⁹ His treatise contains twenty concise or even lapidary entries, providing a synthesis of information. I shall now present all the successive rubrics repeating the information provided by the text and translating some of it.

Mu jun 木菌 [wood mushroom]: this is a ‘wood ear’ (*mu er* 木耳). It grows on rotting wood with neither branch nor leaf, born from the *qi* when the weather is warm and humid. Other names are *mu nou* 木樛, *mu song* 木縱 [wood chicken], *shu ji* 樹雞 [tree chicken], *mu e* 木蛾 [wood butterfly]. The words ‘ear’ and ‘butterfly’ are used by analogy with the shape. The word *nou* 樛 is used because it excels in its tenderness and juiciness. The word ‘chicken’ (*ji*, *song*) is used because of the similar taste, for the southern people call chicken *song*. It is also called *jun* 菌 because the shape resembles that of a shell called *jun* 蜃. It is also said that what grow in the ground are *jun* and what grow on the trees are the *e* 蛾. Northern people call *e* what southern people call *xun* 蕈.

These remarks concerning the differences between the languages spoken in the north and in the south are very valuable because they remind us that before the advent of modern biology in the early 20th century, there was in Chinese no uniform nomenclature for natural objects until such time as they were assessed by

⁶⁰⁵ For its translation, see Sabban (1997, pp. 11–15), and see the article for an analysis of these recipes.

⁶⁰⁶ *Pyrenopeziza betulaefolia* Bge.; Jia Zuzhang and Jia Zushan (1955, Fig. 1124).

⁶⁰⁷ *Shuo fu*, juan 106, 2b–3a, ed. Yuan Wei Shan Tang. Also in Wu Qijun (1959, p. 233).

⁶⁰⁸ This text, like the last one, is reproduced in its entirety in the *Zhi wu ming shi tu kao* (1848); see Wu Qijun (1959, pp. 233–5).

⁶⁰⁹ See Wang Yuhu (1979, p. 149).

the yardstick of *materia medica*. The main difficulty in the identification of the mushrooms cited in the texts that we possess is that they were written by scholars who were natives of southern China and, clearly, the names that they use for mushrooms seem to be very local ones and most of them are not to be found anywhere except in their texts. The following entry, 'five wood ears', *wu mu er* 五木耳, designates a group of mushrooms that grow in the ravines of the Qian Wei hills.⁶¹⁰ They emerge with the abundant rains of the sixth month. They can be eaten once they are dried. In order to illuminate this entry, the author cites Tao Hongjing and Su Kong. The former admits that he does not know what these 'five woods' are since, as far as he knows, only mulberry trees (*sang* 桑) carry 'ears of mulberry trees' (*sang er* 桑耳) of various colours, yellow, dark green, red or white. For the latter, the five trees that bear these mushrooms are mulberry trees (*sang*), *Sophoras* (*huai* 槐), paper mulberry trees (*chu* 楮), elms (*yu* 榆) and willows (*liu* 柳). He thinks that the mushrooms most often eaten come from paper mulberry trees, and the '*Sophora* ears' were only used medicinally. The following entries extend this category and reveal the great ambiguity of the folk nomenclature. The 'mulberry tree ears' (*sang er* 桑耳) that 'crown the mulberry trees' are also called *nou* 樗; *e* 蛾, butterfly; *ji* 雞, chicken; *huang* 黃, 'yellow'; *chen* 臣, 'minister'; or 'mulberry tree parasite', *sang shang ji sheng* 桑上寄生. The '*Sophora* ears', *huai er* 槐耳, are also called '*Sophora* mushrooms', *huai jun* 槐菌, and also, like the mulberry tree, 'chicken', *nou*, 'butterfly'. No morphological or ecological details are given about the 'willow ears', *liu er* 柳耳. The '*Cunninghamia* ears',⁶¹¹ *shan er* 杉耳, grow for several years on *Cunninghamia* trees. They resemble mushrooms, *jun*. The 'honey locust mushroom', *zao jiao jun* 皂莢菌, 'grows on honey locust trees',⁶¹² it is a 'wood ear', *mu er*, and is not edible. 'Perfumed mushroom', *xiang xun* 香蕈, is the name given to the purple mushrooms that grow on the wood of *Paulownias* (*tong* 桐), willows (*liu*) and *Poncirus* (*zhi* 枳). The author notes the etymology of the character *xun* 蕈, which is constructed from the character *cao* 艸, 'grass', and the character *tan* 覃, which means 'to prolong', 'to extend', and refers to the lingering taste of these mushrooms. Should one conclude that another difference between the mushrooms called *jun* and those called *xun* is the fact that the latter have a very strong taste? Another agreeable foodstuff is described in the following rubric, which is devoted to the 'snow mushroom', *tian hua xun* 天花蕈, also called 'snow vegetable', *tian hua cai* 天花菜, which grows on Mount Wu Tai.⁶¹³ Shaped like pine flowers, these mushrooms are the size of a bushel and smell like *xun*, are white in colour and have a very agreeable taste. The following rubric is about the *mo gu xun* 磨菰蕈 that grow in the mountains of the north-east, to the north of the river Huai. Pan Zhihuan writes about them as follows:

⁶¹⁰ A mountain situated to the north of Qian-wei xian, in the southern centre of Sichuan province, roughly 150 kilometres to the south of Chengdu.

⁶¹¹ *Cunninghamia lanceolata* Hook. = *C. sinensis* R. Br.; Jia Zuzhang and Jia Zushan (1955, Fig. 2138).

⁶¹² *Gleditschia sinensis* Lam.

⁶¹³ Wu Tai Shan, one of the five sacred mountains of Daoism and Buddhism in China, situated in the north-east of Shanxi province.

One buries some wood from the paper mulberry tree or the mulberry tree, waters it with water in which rice has been washed and waits for the mushrooms to grow, then one picks them. They are two or three inches tall, small at the base and large at the top, white and tender, hollow inside, and they resemble the flowers of hosta in bud. A popular name for them is *jī zú mó gu* 雞足磨菰 ['chicken foot' *mó gu*]. Their taste is said to resemble that of chicken. One kind resembles sheep's tripe; it is the one that has 'cells like those of a wasps' nest'. Its name is *yáng dù cài* 羊肚菜 [sheep's tripe vegetable].

The text then describes the 'chicken mushrooms', *jī sōng xūn* 雞縱蕈, that grow in Yunnan in sandy soils and have a taste that resembles that of perfumed mushrooms but is not as strong. These are considered to be of inferior quality. The people gather them, dry them and export them far away, as local specialities. They are said to have 'a tall stem and a head like an umbrella'. 'Thunder mushrooms', *lei xūn* 雷蕈, grow in Heng Zhou in Guangxi. Their name comes from the fact that they grow when storms occur. They must be gathered very quickly, otherwise they soon flag or rot and are unusable. They are much appreciated in stews, *gēng* 羹, as are the 'chickens', *jī sōng* 雞縱. 'Rudder vegetables', *duó cài* 舵菜, are mushrooms (*jūn*) that develop on the rudders of ocean-going ships, and so are quite rare. 'Zhong kui mushrooms',⁶¹⁴ *zhōng kuī jūn* 鍾馗菌, are earth mushrooms (*tǔ jūn* 土菌) that appear on the surface of the ground after the autumn rains. Those that grow on top of one another are called 'the headwear of genies', *xiān rén mào* 仙人帽. The reason why this mushroom bears the name of Zhong Kui, a deity, is that its cap is like an umbrella the shape of which resembles the hat of Zhong Kui. It is also called 'earth chicken', *dì jī* 地雞, or 'hydropote-headed mushroom',⁶¹⁵ *zhāng tóu jūn* 獐頭菌.

The term 'ghost mushroom', *guǐ jūn* 鬼菌, designates a kind of mushroom that has a number of other names, 'ghost canopy' (*guǐ gāi* 鬼蓋), 'ghost's umbrella' (*guǐ sān* 鬼傘), 'ghost's home' (*guǐ wū* 鬼屋). They grow in groups at the bottom of walls, in the summer, after rain. They are often coloured red. They may also grow on heaps of manure. They blacken slightly when exposed to the sun and 'are born in the morning and die in the evening'. Other names for them are 'ground canopy' (*dì gāi* 地蓋) and also 'ground ling' (*dì líng* 地苓). There are also 'ghost brushes' (*guǐ bǐ* 鬼筆), which grow on refuse. Their cap resembles a brush and they are purple in colour. They are called 'flowers born in the morning and withered by the evening', *chāo shēng mù luò huā* 朝生暮落花. Children call them 'dog's piss', *gǒu nǐ* 狗溺.⁶¹⁶ They belong to the category of 'ghost canopies', *guǐ gāi*, but do not form an umbrella. All these mushrooms are excellent for treating wounds and spots. Once they are dried, they are reduced to powder and mixed with oil. The 'black mushrooms', *hēi jūn* 黑菌, that grow on dung are also very good for that. There are also 'horse vetches', *mǎ bó* 馬勃, likewise belonging to the category of mushrooms, *jūn lèi* 菌類.

⁶¹⁴ A mythical figure, a hunter of demons.

⁶¹⁵ *Hydropotes inermis* Swinhoe; see Shou Zhenhuang (1962, p. 445).

⁶¹⁶ A similar name is to be found in Vietnam and the reason for such a name is connected to the fact that it was thought that such mushrooms were produced from the urine of a dog. See Sallet (1939, p. 34).

'Fresh shoots of bamboos', *zhu ru* 竹蓐, are the subject of the following rubric of the treatise. I translate it in its entirety as this passage seems to me to be typical of the intellectual procedure of the author.

The *zhu ru* 竹蓐 [fresh shoots of bamboos] are *zhu gu* 竹菰 [bamboo mushrooms]. The fresh shoots of the grasses are called *ru* 蓐 [for] they form when the atmosphere (*qi*) is very humid (*ru shi* 溽濕). In [the Supplement to] the *Materia medica* [of the Divine Labourer]⁶¹⁷ it is 'bamboo meat' (*zhu rou* 竹肉) because of its taste. It grows in *Sinocalamus* forests (*ci zhu* 慈竹).⁶¹⁸ When it rains in the summer months and the raindrops are absorbed by the earth, they emerge like the antlers of deer. Those that are white are edible. Those that emerge from the branches of bitter bamboos (*ku zhu* 苦竹)⁶¹⁹ resembling pieces of meat like chicken eggs are very poisonous. There are also those that are called 'bamboo mushrooms' (*zhu gu* 竹菰). They grow on the joints in the roots⁶²⁰ of rotted bamboos, their shape is similar to that of the 'wood ears' and they may be red or white. It is these that are described in the *You yang za zu*: 'between the Huai and the Yangzi there are "bamboo meats" (*zhu rou* 竹肉) as large as crossbow balls, which taste of "white tree-chickens" *bai shu ji* 白樹雞'. Only the ones that grow on bitter bamboos are poisonous.

This description is hard to understand because of the title, *zhu gu* 竹菰, 'bamboo mushrooms', which is mentioned twice as being synonymous with different terms that clearly designate different objects. Furthermore, in the phrase taken from the *You yang za zu*, Pan Zhihuan has slightly modified the original text, which referred not to 'white tree chickens', *bai shu ji*, but to 'white chickens', *bai ji* 白雞.⁶²¹

'Reed mushrooms', *guan jun* 藺菌, grow among reeds and bulrushes on the saline soils of the marshy zones of the Bo Hai. These mushrooms are white, light and hollow. Unlike other mushrooms, the interior and exterior are identical. The character *guan* 藺 also signifies 'stork'.⁶²² Some people thought that these mushrooms were transformations of the dung of these birds. The author declares that this is not the case. They are used as worm-powder to get rid of threadworms.

The next two rubrics concern 'earth ears' and 'stone ears'. The former, *di er* 地耳, also called *di ta gu* 地踏菰, 'rammed-earth' *gu*, are said to belong to the genus of the latter, to grow on hillsides and to be the colour of green jasper. The latter, *shi er* 石耳, are also called *ling zhi* 靈芝, 'marvellous *zhi*'. They grow at the top of high cliffs and from afar look like smoke. Those who gather them are let down on long ropes for they are only to be found in perilous positions. Under the Ming, they were particularly abundant in the Lu Shan. The monks used to collect them, dry them

⁶¹⁷ This was the *Ben cao shi yi*, completed around +739 by Chen Zangqi. This text today exists in the form of numerous citations, in particular in the *Zheng lei ben cao* by Tang Shenwei and the *Ben cao gang mu* by Li Shizhen. See SCC Volume 6, Part 1, p. 275. See also Okanishi Tameto (1977, pp. 76–8); Unschuld (1986, pp. 50–3).

⁶¹⁸ *Sinocalamus affinis* (Rendle) McClure, cf Geng Yili (1965, p. 76).

⁶¹⁹ The monograph on the Gramineae (Poaceae) (Geng Yili 1965) mentions five different kinds of bamboo now known by this name. It seems, however, that we can settle on *Phyllostachys bambusoides* Sieb. et Zucc. See Geng Yili (1965, p. 96); Jia Zuzhang and Jia Zushan (1955, Fig. 2080).

⁶²⁰ These are rhizomes, underground stems. ⁶²¹ See anon. (1983a, *Ci yuan*, p. 3315).

⁶²² Anon. (1983a, *Ci yuan*, p. 3315).

and export them to distant places. When washed and cleaned of the sand, they made an excellent dish, better than the ‘wood mushrooms’, *mu er* 木耳.

The last mushrooms listed are the ‘*Pueraria* milk’, *ge ru* 葛乳.⁶²³ Even though they are abundant on all the famous mountains, only those from Tai He Shan 太和山 are collected.⁶²⁴ They are ‘the essence of *Pueraria*’, *ge zhi jing hua* 葛之精華. They are red and spread over the ground at the time of white autumn frosts, in the same manner as *zhi jun* 芝菌.⁶²⁵

Reading all the rubrics of this treatise is particularly interesting as it reveals language practices relating to the names of various kinds of mushroom that show how difficult it is to interpret this nomenclature. There are generic terms, such as *mu er* 木耳, ‘wood ear’, the meaning of which is wider than that of the contemporary scientific term⁶²⁶ and designates some of the mushrooms that grow on trees, such as the ‘mulberry tree ears’ (*sang er* 桑耳), ‘*Sophora* ears’ (*huai er* 槐耳), ‘willow ears’ (*liu er* 柳耳) and so on. However, other mushrooms that grow on trees are called ‘perfumed mushrooms’, *xiang xun* 香蕈, if their colour is purple. The etymology indicated for *xun* 蕈 refers to the meaning of the lower part of this character, *tan* 覃, which means to extend or to prolong, which precisely is a characteristic of the taste of these mushrooms. This suggests that, since one of their characteristics is a persistent – and perhaps agreeable – taste, they are edible. This would distinguish them from the *jun* 菌, which do not a priori have a pronounced taste and may not be edible. ‘Ghost mushrooms’, *gui jun* 鬼菌, designates another group with two sub-groups, the ‘earth canopies’, *di gai* 地蓋, which have an umbrella-shaped cap, and ‘ghost brushes’, *gui bi* 鬼筆, the cap of which is not that shape. Finally, there is the ‘genus of stone ears’, *shi er zhi shu* 石耳之屬, also called *ling zhi* 靈芝, ‘marvellous *zhi*’, which are mushrooms that emerge from the ground.

Li Shizhen's Ben cao gang mu

Li Shizhen was a contemporary of Pan Zhihuan. As was his custom he set about producing a synthesis of the available knowledge based on the ancient sources. He classified fifteen kinds of mushroom in the fifth category of the vegetables section, *cai bu* 菜部 (*juan* 27), under the title *zhi er* 芝耳, right after the ‘aquatic vegetables’ category. The first mushroom cited is *zhi* 芝. Li Shizhen justifies his decision to place it among the vegetables on the basis of the fact that in bygone days the ‘four hoary hermits of the Shang mountains’, *si hao* 四皓, used to gather them and the genies, *xian* 仙, used to eat them. It is interesting to note that in his text he designates the group of mushrooms as a whole by the expression *jun shu* 菌屬, ‘the genus of the

⁶²³ *Pueraria lobata* (Willd.) Ohwi (= *P. thunbergiana* (Sieb. et Zucc.) Benth.) – *kuzu* in Japanese.

⁶²⁴ This mountain, situated in the north-east of Hubei province, close to Jun xian 均縣, has several names, one of which is ‘dwelling of the genies’, *xian shi*. See Zang Lihe (1982, p. 141).

⁶²⁵ This term, despite the presence of *zhi* 芝, certainly refers not to ganoderms, which grow upright, but rather to other mushrooms that sprawl over the surface of the ground.

⁶²⁶ *Auricularia auricula* (L. ex Hook.) Underw. (anon. 1971, no 0701, p. 353), one of the ingredients used in Chinese cooking today.

jun’,⁶²⁷ thereby bestowing on *jun* a generic sense, with *zhi* 芝 within this category designating the whole group of useful mushrooms. Considering the category of the *zhi*, he comments that it is extremely rich and that there are also kinds that flower and fructify. He adds that although only six are named in the pharmacopoeia, it is impossible not to recognise that there are many more.⁶²⁸ To illustrate this statement, he lists some extraordinary *zhi* that are mentioned in the *Bao pu zi*. However, at the end of this long passage he makes an unequivocal remark.⁶²⁹ Drawing attention to the fact that *zhi* are born from the *qi* of rotten wood and are totally analogous to the excrescences produced by human bodies, he concludes that it is absurd to believe that they are plants of good omen and that eating them can render one immortal. I am referring here only to the six mushrooms that he considers to be *materia medica*. These all appear in the *Shen nong ben cao jing*. Each is characterised by a different colour, referring back to the classification of all things according to the system of the Five Phases, *Wu xing*. The colours are the following: the dark green *zhi* (*qing zhi* 青芝), synonymous with the dragon *zhi* (*long zhi* 龍芝), the dark red *zhi* (*chi zhi* 赤芝), synonymous with the cinnabar *zhi* (*dan zhi* 丹芝), the yellow *zhi* (*huang zhi* 黃芝), synonymous with the gold *zhi* (*jin zhi* 金芝), the white *zhi* (*bai zhi* 白芝), synonymous with the jade *zhi* (*yu zhi* 玉芝), the black *zhi* (*hei zhi* 黑芝), synonymous with the dark *zhi* (*xuan zhi* 玄芝), and finally the purple *zhi* (*zi zhi* 紫芝), synonymous with the wood *zhi* (*mu zhi* 木芝). Even though Li Shizhen dismisses the absurdity of traditional beliefs about the extraordinary properties of these mushrooms, it is remarkable that a property mentioned in the *Shen nong ben cao jing* is that of ‘relieving the body, preventing it from ageing and prolonging life’, which is common to the six kinds of mushroom that are cited, is characteristic of drugs of the upper rank and is a property that he mentions in his own text. That formulation shows that even if the quest for immortality is declared to be ridiculous, to seek long life in an unburdened body is still perfectly acceptable.

The second rubric in this section is devoted to ‘tree ears’, *mu er* 木耳. Li Shizhen defines them as the product of an excess of damp heat: they grow on rotted trees and possess neither stem nor leaves. He cites several of the synonyms that we have already encountered, *mu er* 木柄, *mu jun* 木菌, *mu song* 木縱, *shu ji* 樹雞 and *mu e* 木蛾, and provides an etymology. *Er* 耳, ‘ear’, and *e* 蛾, ‘butterfly’, are explained by an analogous shape; *er* 蛾 is related to heat and humidity; *ji* 雞 and *song* 縱, ‘chicken’, are explained by a resemblance in taste; *jun* 菌 too is explained by a shape analogous to that of a shell, the name of which is a homophone. He also explains that ‘that which grows on the ground is called *jun* 菌; that which grows on trees is called *e* 蛾. People in the north say *e* 蛾, those in the south say *xun* 蕈.’⁶³⁰ The generic sense of the term *mu er* 木耳 is clearly stated. ‘Tree ears grow on all trees and are wholesome or poisonous depending on the nature of the tree ... Those

⁶²⁷ Even though, in the terminology of modern biology, *shu* designates a precise taxonomic level, that of the genus, in the context of the *Ben cao gang mu* it should be understood in an ethnobiological sense.

⁶²⁸ Li (1975–81, p. 1709).

⁶²⁹ Li (1975–81, pp. 1709–11).

⁶³⁰ Li (1975–81, p. 1712).

nowadays commercialised come essentially from mulberry trees, paper mulberry trees, willows and elms'. The next two rubrics are devoted to the 'mulberry tree ear', *sang er* 桑耳, and the '*Sophora* tree ear', *huai er* 槐耳. It may be thought that modern mycologists have decided to use the term *mu er* to designate a single species that grows on the trunks of rotting trees,⁶³¹ whereas the ancient Chinese used it as a generic term that distinguished several different kinds by the trees upon which they grew. However, in view of the existence of several species of the *Auricularia* genus in China, some of those ancient names may also correspond to distinct botanical species. The documents to which I have access do not enable me to settle this question.

The two very brief entries that follow concern a *shan jun* 杉菌, a mushroom that grows on old *Cunninghamia* trees,⁶³² *shan* 杉, and a poisonous mushroom that grows on honey locust trees⁶³³ and that is therefore called *zao jia jun* 皂莢菌, 'the honey locust mushroom'. Then comes a long passage devoted to the meaning of *xun* 蕈 in connection with the entry *xiang xun* 香蕈, 'perfumed mushroom'. Li Shizhen, repeating passages that we have already read, first explains that the character *xun* 蕈 is constructed on the basis of the character *tan* 覃, which means 'to extend' or 'to prolong' and refers to the persistent taste of these mushrooms. He goes on to note that there are numerous *xun*.⁶³⁴ Finally, he repeats that '*zhi jun* 芝菌 mushrooms are all produced by *qi*'.⁶³⁵ He then cites at length the text of nine of the eleven rubrics of the Treatise on Mushrooms, *Jun pu*, by Chen Renyu, which has been described above. In this way, he successively mentions the *he xun* 合蕈, for which he indicates a new synonym, *tai xun* 台蕈, then *chou gao xun* 稠膏蕈, *song xun* 松蕈, *mai xun* 麥蕈, *yu xun* 玉蕈, *huang xun* 黃蕈, *zi xun* 紫蕈, *si ji xun* 四季蕈 and *e gao xun* 鵝膏蕈. So, in the *Ben cao gang mu*, the term *xiang xun* 香蕈, which nowadays designates a precise botanical species,⁶³⁶ takes on a generic sense that includes all the nine kinds cited. The text that describes the following mushroom is borrowed directly from the *Guang jun pu*, but Li Shizhen makes no reference at all to the author of this treatise and thus claims authorship of this rubric. He chooses as the principal term for *ge ru* 葛乳, 'Pueraria milk', which is cited in the *Guang jun pu*, a synonym, *ge hua cai* 葛花菜, 'vegetable flower of the Pueraria', which is an introduction of his own. Li Shizhen himself does not appear to know to what the *tian hua xun* 天花蕈, 'snow mushroom', or *tian hua cai* 天花菜, 'snow vegetable', that he next mentions, really correspond. He wonders if it may be the *shu ji* 樹雞, 'tree chickens', which 'resemble wooden cups' and are mentioned by Duan Chengshi. On this point I shall try to provide him with an answer. In the next entry, *mo gu xun* 蘑菰蕈, which repeats in full the text of

⁶³¹ *Auricularia auricula* (L. ex Hook.) Underw.

⁶³² *Cunninghamia lanceolata* Hook. (= *C. sinensis* R. Br.); Jia Zuzhang and Jia Zushan (1955, Fig. 2138). A possible identification for this mushroom, found in a Japanese translation, is *Pholiota squarrosa* (Fr.) Quél. Cited by Kitamura Shiro (1985, p. 407).

⁶³³ *Gleditsia sinensis* Lam.; Jia Zuzhang and Jia Zushan (1955, Fig. 987).

⁶³⁴ *Xun pin bu yi* 蕈品不一, Li Shizhen (1975–81, p. 1717).

⁶³⁵ *Zhi jun jie qi zhuo ye* 芝菌皆氣茁也.

⁶³⁶ *Lentinus edodes* (Berlk.) Sing. It is known as oak lentin, shiitake or (sometimes) perfumed mushroom.

the *Guang jun pu*, again without any reference to it, Li Shizhen's only contribution is a synonym for the principal name, *rou xun* 肉蕈, 'fleshy mushroom'.

The next entry, also mainly in the form of a citation from the text of the *Guang jun pu*, but giving no reference, concerns the *ji song*, 'chickens'. On the next mushroom, the *duo cai* 舵菜, the 'rudder vegetable', Li Shizhen states only what we have just noted in the *Guang jun pu*, which he repeats, again without mentioning his source. The 'earth mushrooms', *tu jun* 土菌, that form the next entry are poisonous mushrooms with a hairy cap. In an attached entry, *gui gai* 鬼蓋, 'ghost canopies', which are not poisonous, Li Shizhen adds *di ling* 地苓, a yellowish version of the latter, and *gui bi* 鬼筆, 'ghost brushes'. The 'bamboo mushrooms', *zhu ru* 竹蓐, just described in the *Guang jun pu* are then cited. Li Shizhen also takes over the text of Pan Zhihuan in its entirety, without citing it but this time indicating a quotation from the *You yang za zu*. The entry 'reed mushroom', *guan jun* 藺菌, is accompanied by notes on the ancient belief that it was produced by the transformation of storks' droppings. This belief, recorded by Tao Hongjing, was later contradicted in the *Tang ben cao*. The last two entries in this section of the *Ben cao gang mu* concern two 'ears', the one an 'earth ear', the other a 'stone ear'. In the former case, Li Shizhen adds to what is stated in the *Guang jun pu* that its appearance is similar to that of 'wood ears', that it grows during the spring and summer rains and it must be picked without delay as the sun ruins it. As for the 'stone ears', Li Shizhen also mentions the synonymy with *ling zhi*.

The *Wu xun pu* 吳蕈譜 (Treatise on the Mushrooms of the Lower Yangzi) is the last of the treatises specifically about mushrooms. It is not known when it was completed but it must have been after 1683 – as we can tell from a fact noted at the end of the work – and it presents the most structured approach to knowledge on this subject. Little is known of its author, Wu Lin 吳林, *zi* Xiyuan 息園, a native of Changzhou 長洲 in Jiangsu province.⁶³⁷ This treatise may be divided into three parts.⁶³⁸ The first and the last refer to generalities and the middle part consists of a list of mushrooms, accompanied by descriptions of them and their uses. The text starts with a citation from the *Gu su zhi* 姑蘇志, a local monograph on the *Wu xian* in Jiangsu, which notes that the terms *xun* 蕈 and *jun* 菌 are synonymous. A second citation from 'the ancient monograph on the Yang hills', in Jiangsu, the *Yang shang jiu zhi* 陽山舊志, provides information on the very nature of mushrooms. They 'emerge when the fats (*zhi* 脂) of plants that have sunk into the soil are inflated by the fat and humidity of that soil. They are what emerge for *jing zhe* 驚蟄 ['the awakening of the hibernators']'.⁶³⁹ Mountain dwellers call them 'fear of thunder', *lei jing* 雷驚.⁶⁴⁰ Another mode of production is mentioned for poisonous mushrooms: some mushrooms may be born from the dribble of snakes. This text also contains

⁶³⁷ See Wang Yuhu (1979, p. 209). ⁶³⁸ I am using the edition of the *Nong xue cong shu*.

⁶³⁹ This name applies to the sixth of the twenty-four periods of fifteen days of the solar year, which begins around 5 March.

⁶⁴⁰ *Jun zhe gai cao mu zhi zhi ru tu jian de gao ze ce sheng, jing zhe shi sheng zhe, shan ren ming yue lei jing* 菌者盖草木之脂入土兼得膏澤則生,驚蟄時生者,山人名曰雷驚.

other precious information. First, it makes it possible to appreciate the terminology that is peculiar to the description of these objects. Mushrooms possess a 'stem' which is designated by the same term as that for herbaceous plants, *jìng* 莖, or else by *jiǎo* 腳, 'foot'. They have a 'face', *miàn* 面, the upper part of the cap; a 'mouth', *kǒu* 口, which is situated in the lower part; and numerous 'pleats', *jiàn* 襴, gills.⁶⁴¹ Normally, the cap 'develops in the shape of an umbrella', *zhāng sǎn* 張傘. When the upper part of the cap is concave, 'it does not form an umbrella'. In both cases, the edge may be 'slightly curled', *shǎo juǎn* 少卷. Finally, the 'mushroom flowers', *jūn huā* 菌花, 'resemble *nú*'. This remark suggests that these 'flowers',⁶⁴² for which I have suggested an interpretation above, are certainly yellow in colour.⁶⁴³ As to their nature, the author states that 'the mushrooms are vegetables that have no root and that, two or three days after they appear, rot and cannot be eaten'.⁶⁴⁴ The colour of the 'face', that of the pleats and, to a lesser extent, the taste and smell are the principal criteria for distinguishing and naming the various kinds that can be found.

Wu Lin suggests the etymology for most of the names that he cites. Thanks to this, we are provided with a glimpse of the many semantic fields of reference for this nomenclature. Mushrooms may be named by their relation to their environment. Those that grow on sandy soil are thus 'sand-bearing', *dài shā* 戴沙; 'stone mushrooms', *shí jūn* 石菌, or 'snow mushrooms', *xuě xūn* 雪蕈. Those that grow on scrubland are called 'faggot mushrooms', *máo chái xūn* 茅柴蕈; in a field of mulberry trees they are 'mulberry tree mushrooms', *sāng xūn* 桑蕈. If they grow on trees, they are systematically named after the tree on which they are parasites – 'paper mulberry tree mushroom' is one example; likewise, if they grow under particular trees, they are named after those trees, for example 'mushroom of the Japanese apricot tree', *méi xūn* 梅蕈. Many mushrooms are named after their appearance. As I have already mentioned, colour is an important element and so is shape. So we find 'Buddha's hand mushrooms', 'umbrella mushrooms' and 'goose egg mushrooms' or, slightly smaller, 'hen's egg mushrooms'. Other kinds bear names that relate to phenology. A mushroom that grows at the time when cabbages are flourishing is called 'mushroom of flourishing cabbages', *cài huā xūn* 菜花蕈. The 'sugar mushroom', *táng xūn* 糖蕈, is so called because of its sweet taste. It is because eating it irritates the throat that another mushroom is called 'ginger mushroom', *jiāng xūn* 薑蕈. Finally 'laughing mushrooms', *xiào xūn* 笑蕈, are so named because of the effect of eating them. These grow on liquidambar, *fēng shù* 楓樹.⁶⁴⁵ As a general rule, the dangerous nature of a mushroom is indicated by a 'difference' from its normal state. The cause of such a change, it is claimed, by analogy to what is written in the

⁶⁴¹ To refer to the gills that are present on the underside of the cap in many mushrooms, the author uses this character *jiàn*, which in its original sense designates the pleats in an item of clothing. Nowadays the synonym *zhē* 褶 is used.

⁶⁴² This comparison of 'mushroom flowers' to *nú* supports my hypothesis concerning phenomena peculiar to certain species, in particular those of the *Ganoderma* genus. See above, pp. 352–3.

⁶⁴³ On the meaning of *nú*, see my interpretation at p. 134 above. ⁶⁴⁴ *Wu xūn pu*, 6a.

⁶⁴⁵ *Liquidambar taiwaniana* Hance (anon. 1977b, Fig. 5177).

Suo sui lu 瑣碎錄 on the subject of fruit trees, is the fact that a snake is living beneath it.⁶⁴⁶ But the sole – and eminently wise – rule that the author gives for avoiding being poisoned is only to eat mushrooms that are named and whose appearance one recognises. He then logically proceeds to list the edible mushrooms that he knows, in all twenty-five main kinds, which he divides into nine of the top rank, eight of the intermediate rank and eight of the lower rank. In the absence of accurate dictionaries, it is hard to identify their names. Before making an attempt to do so, here is an exhaustive list of these various kinds along with their principal characteristics.

Top rank, shang pin 上品

Lei jing xun 雷驚蕈 [fear of thunder mushroom], synonym *dai sha* 戴沙 [sand bearer]; *shi xun* 石蕈 [stone mushroom]. In the course of the second month comes the moment of the awakening of the hibernators (*jing zhe* 驚蟄) when these are produced, which is why they are called *lei jing* 雷驚 [fear of thunder]. This moment is when the east wind melts the ice. The earth restores itself, the *qi* warms up. The bright yellow mushroom flowers⁶⁴⁷ appear through the sand. Hence the name 'sand-bearer'. The mushrooms are dark brown on the outside, the 'pleats' are white like jade, brilliant and immaculate, very beautiful. When they grow larger they take on the shape of an umbrella. Their taste is sweet and agreeable and they are tender and melting. There is another kind of a black colour. It is called 'black fear of thunder' (*wu lei jing* 烏雷驚). The 'pleats' have red streaks. Mountain folk call them 'black mushrooms with red pleats' (*hong jian wu xun* 紅襖烏蕈). These are the earliest ones. They are sweet to taste and slippery. When they start to grow, they are called 'little mushrooms' (*xun zi* 蕈子). The yellow ones are called 'yellow fears of thunder' (*huang lei jing* 黃雷驚). They are a tender yellow as though they have been dyed; their colour is like that of pine-tree flowers, hence the name 'pine-flower mushrooms' (*song hua jun* 松花蕈). Their taste is excellent. As long as the hibernating insects do not budge, poisonous mushrooms do not emerge. They surpass in excellence all the mushrooms of Suzhou.⁶⁴⁸

*Mei shu*⁶⁴⁹ *xun* 梅樹蕈 [Japanese apricot mushroom]. These small mushrooms with a strong taste generally grow beneath Japanese apricot trees. They are white with a dash of dark green. The gills are the colour of lotus seeds.

Cai hua xun 菜花蕈 [mushroom of flourishing cabbages]. These mushrooms of puny aspect that appear in the second or third month at the time when the cabbages flourish, are, on the outside, the colour of eagle wood.⁶⁵⁰ The slightly curled cap does not form an umbrella, the pleats are white.

Gu shu xun 穀樹蕈 [paper mulberry tree mushroom]. These small and puny mushrooms have a long stalk and a thin cap that does not form an umbrella. They are yellowish in colour and have a fresh taste but are rather leathery. They grow in the second and third months. A synonym is *huang er xun* 黃耳蕈 [yellow ear mushroom].

Cha ke xun 茶棵蕈 [tea plant mushroom]. Colour of soy sauce, white gills, large cap, long stalk. Excellent taste but rather leathery.

⁶⁴⁶ 'When a fruit presents an abnormal aspect, there is always a poisonous snake at the root [of the tree]. Avoid eating it'. *Suo sui lu*, section on fruits, general aspects, *guo, guo mu zong shuo*.

⁶⁴⁷ Literally, 'like anthers'. ⁶⁴⁸ *Wu xun pu*, 2a.

⁶⁴⁹ *Prunus mume* Sieb. et Zucc. Jia Zuzhang and Jia Zushan (1955, Fig. 1102).

⁶⁵⁰ *Chen xiang* 沉香, *Aquilaria agallocha* Roxb. When it is infested by a mushroom, the wood of this tree becomes very fragrant, hence the Chinese name 'heavy perfume'. It is a reddish brown colour. On the use of this aromatic product, aloeswood, under the Tang, see Schafer (1963, pp. 163–4).

Sang shu xun 桑樹蕈 [mulberry tree mushroom]. Some are purple, others yellow. They resemble the *xiang xun* 香蕈 [perfumed mushrooms]. They are produced in fields of mulberry trees and beneath the trees in gardens close to mountains. Notes draw attention to the fact that the mushrooms that grow on the visible roots of mulberry trees are poisonous.

E zi xun 鵝子蕈 [goose egg mushroom], popular synonym with the same meaning as *e luan xun* 鵝卵蕈. Resembles a goose egg but is larger. Does not make an umbrella, has an external protective envelope inside which are the gills. They are visible when the envelope eventually splits. Very sweet taste, slippery. The white ones are called *fen e zi* 粉鵝子 [goose eggs of flour], the yellow ones *huang e zi* 黃鵝子 [yellow goose eggs], the black ones *hui e zi* 灰鵝子 [goose eggs of ashes]. These mushrooms are considered to be of excellent quality. Belonging to the same category there are *huang ji luan jun* 黃雞卵蕈 [yellow hen's egg mushrooms], which are yellow but smaller.

Mao chai xun 茅柴蕈 [bush mushrooms]. Grow in groups in the spring, in the mountain bushes. At first they are enveloped in a white volva, when they grow larger they develop an umbrella and the gills take on a purplish colour, hence their other name *hong jian xun* 紅襖蕈 [mushrooms with red pleats]. Very tender with a good taste.

Tang xun 糖蕈 [sugar mushrooms]. These are *song xun* 松蕈 [pine tree mushrooms]. They grow densely beneath the pines. They emerge from the pine flowers that fall to the ground. They are also called *zhu yu xun* 珠玉蕈 [pearly jade mushrooms]. They are purplish brown in colour, the edges of the cap are slightly rolled up and their taste is as sweet as sugar, hence their name. They used to be preserved in various ways, the best known process being smoking, which made it possible to export them far away. Those of the fourth month were called *qing cao tang xun* 青草糖蕈 [sugary mushrooms from dark green grasses]; those of the eighth month *xi feng tang xun* 西風糖蕈 [sugary mushrooms of the west wind]. These are white in colour and are called *bai tang xun* 白糖蕈 [sugary white mushrooms]; the ones that are yellow are *huang tang xun* 黃糖蕈 [yellow sugary mushrooms]. There is also a kind called *gan tang xun* 乾糖蕈 [dry sugary mushrooms], which resemble *nai zhi xun* 奶汁蕈 [milk mushrooms]. These have a white stem. They all have a delicious taste. As Chen Renyu 陳仁玉, the author of the Treatise on Mushrooms (*Jun pu* 菌譜), says, 'whatever comes from pine trees cannot fail to be enjoyable'!

Middle rank, zhong pin 中品

Zi mian xun 紫面蕈 [mushroom with purple cap]. Cap slightly mauve, pleats of an immaculate white. Produces a large umbrella. Delicious taste. Particularly abundant in the spring and in summer in the Huang Shan.

Ye za ban xun 野雜斑蕈 [spotted wild mushroom]. Grey colour with black spots, white pleats. Black edges to cap. Long stem with mottling like a pheasant. Grows in the spring and the summer.

Yang shu xun 楊樹蕈 [willow mushroom]. White all over. Tastes of chicken. Fibrous and leathery flesh. Slight smell of goat. Mountain folk keep them for themselves as there is no point in taking them to market.

Nai zhi xun 奶汁蕈 [milk mushroom]. Yellowish brown, rolled cap. When it is struck, it bleeds milk. Very firm consistency, not eaten by insects. Not much taste. Grows throughout the year. One kind has a long stem, another a short one. There are also white ones that are edible.

Qing mian zi xun 青面子蕈 [mushroom with a dark green face]. The 'face', or cap, carries dark green and white marks. When the umbrella is open, they are called 'dark green face'

(*qing mian zi* 青面子), 'white face' (*bai mian zi* 白面子) if the cap is white, 'red face' (*hong mian zi* 紅面子) if it is red. There are even 'ochre faces' (*zhe mian zi* 赭面子) popularly called 'pock-marked' (*yan mian zi* 黥面子). They all have an agreeable taste and are edible.

Fo shou xun 佛手蕈 [Buddha's hand mushroom], synonyms are 'broom mushroom' (*sao zhou xun* 掃帚蕈), 'reed mushroom' (*deng cao xun* 燈草蕈⁶⁵¹) or 'spring onion shaft mushroom' (*cong guan xun* 蔥管蕈). They grow in clumps from a common root, like soya shoots (*dou ya cai* 豆芽菜) but are of a greyish colour. Very mucilaginous and with a delicate taste. They appear mostly in the third month. They are treasured by the peasants who are particularly fond of them.

Zi hua xun 紫花蕈 [mushroom with mauve flowers]. Mauve face, yellow pleats, agreeable taste. Begin to grow in the autumn and the winter.

Jiang huang xun 薑黃蕈 [turmeric mushroom⁶⁵²]. It has the colour of turmeric. It is also called 'yellow gardenia mushroom' (*zhi huang xun* 梔黃蕈) and 'yellow chicken mushroom' (*ji huang xun* 雞黃蕈), the latter term referring to 'chicken' mushrooms (*ji song* 雞蹤). The edge of the cap is lacy but not rolled and it does not form an umbrella. A very fresh and agreeable taste. Much prized by mountain folk.

Deng tai xun 燈臺蕈 [lamp-stand mushroom], also called 'chicken-leg mushroom' (*ji tui xun* 雞腿蕈). Puny appearance, long stem, yellowish colour, forms an umbrella, closely resembles what is called a 'T-shaped mushroom' (*ding xun* 丁蕈) in the Supplement to the Monograph on the Western Lake (*Xi hu zhi* 西湖志).

Lower rank, xia pin 下品

Bie po zi xun 癯婆子蕈 [emaciated old woman mushroom], also called 'old woman' (*lao po* 老婆). A fleshy mushroom but with a wrinkled face, the most grotesque of all mushrooms. Colour pale yellow with some black. Resembles the 'yellow chicken mushroom' (*ji huang xun* 雞黃蕈).

Fen tuan xun 粉團蕈 [ball of flour mushroom], also called 'jade mushroom' (*yu xun* 玉蕈). Pure white like jade, seems to be made of dry flour. Does not form an umbrella. Sugary taste.

Ju pi xun 橘皮蕈 [orange peel mushroom]. Orange in colour. Peppery smell. Resembles a 'pig's blood mushroom' (*zhu xue xun* 豬血蕈).

San zi xun 傘子蕈 [umbrella mushroom]. Yellow like the 'milk mushroom' (*nai zhi xun* 奶汁蕈). Forms an umbrella. Grows in the Huang Shan.

Mian jiao xun 麪腳蕈 [foot-in-dough mushroom]. White and mucilaginous, fresh and agreeable taste.

Zi xue xun 紫血蕈 [mauve blood mushroom]. Mauvish cap and red pleats. Fresh and agreeable taste.

The last part of the text concerns generalities found in citations. For example, the author notes that whereas all vegetables cultivated in gardens are free from poison, that is not the case with mushrooms:

⁶⁵¹ *Deng cao* or *deng xin cao* designates a botanical variety of reed, *Juncus effusus* L. var. *decipiens* Buchen, the pith of which is used for making the wicks for oil lamps, hence its Chinese name 'grass for lamps', 'grass for wicks'. It grows in dense clumps.

⁶⁵² *Curcuma longa* L. (anon. 1977b, Fig. 3564).

They all emerge from transformations of plants.⁶⁵³ Those that come from trees are the *xun* 蕈, those that come from the earth are the *jun* 菌. Furthermore they are also the product of the transformation of the damp *qi* from evaporation in the forests. That is why some are poisonous. If they eat them, men are poisoned and usually die swiftly. Those who do not die are the ones who manage to make themselves vomit.⁶⁵⁴

A number of signs of toxicity are described. A citation from the *Ben cao shi yi* by Chen Zangqi informs us that *jun* mushrooms are free from poison in the spring but are poisonous in the autumn and the winter. Other indications include the emergence of a snake from beneath the mushroom, and the facts that it is phosphorescent in the dark, and when rotting the mushroom remains untouched by any insect; that it cannot be cooked; that it burns producing a flame that does not project a person's shadow; that it has hair on the top and no marks underneath; and that it is vermilion in colour and twists over at the top. A number of authors agree on the fact that poison is produced when mushrooms absorb thick juices from the earth and excrete liquids. Growing close to tombs is another cause of poison in mushrooms. One source even mentions an ancient tomb full of snakes.

A method for detecting toxicity is indicated. If one cooks mushrooms with ginger and grains of cooked rice and these turn black, the mushrooms are deadly poisonous.⁶⁵⁵ The antidote to uncheckable laughter has been noted above. Another way of avoiding poisoning was to place water freshly drawn from the well into a hole dug in the ground, then stir it until it became cloudy, then leave it to rest a little and then drink the water. Another method was to make a soup from the earth from old walls, leave it to decant and cool, then drink the liquid. Another was to cook liquorice in sesame oil, bring it to the boil several times, then allow it to cool and drink it. An anecdote from the *Yi jian zhi* 夷堅志 told how five monks from the Monastery of White Clouds, close to Suzhou, poisoned themselves with large mushrooms that they had gathered in the mountains.⁶⁵⁶ When gripped by violent vomiting in the night after their meal, three of them managed to save their lives by eating raw honeysuckle,⁶⁵⁷ but the other two, who had not dared to do so, died. In another case, the use of *Houttuynia*,⁶⁵⁸ a plant reputed to cure snakebites,⁶⁵⁹ was successful.⁶⁶⁰ The various curative methods appear to be founded on two principles: allopathy, involving the use of a variety of drugs, mostly from plants, above all liquorice, *gan cao* 甘草, and homeopathy, involving drinking the urine of a hanged

⁶⁵³ *Jie shi cao mu bian hua suo sheng* 皆是草木變化所生.

⁶⁵⁴ *Wu xun pu*, 4b.

⁶⁵⁵ *Wu xun pu*, 4a.

⁶⁵⁶ The *Yi jian zhi* 夷堅志 is a collection of anecdotes, many of a supernatural character, composed by Hong Mai 洪邁 (+1123–+1202).

⁶⁵⁷ *Lonicera japonica* Thunb. The author notes two names for this climbing plant, which is very common in most of the provinces of China, *luan yang cao* 鸛鴛草 and *jin yin hua* 金銀花. Nowadays the second name designates the floral bud used in *materia medica*; see anon. (1977b, Fig. 2417).

⁶⁵⁸ *Houttuynia cordata* Thunb., *ji cai* 戟菜, *yu xing cao* 魚腥草; see anon. (1977b, Fig. 2999).

⁶⁵⁹ Nowadays this property is still attested in Chinese *materia medica*; see anon. (1977b, Fig. 2999). The justification invoked in this text was that if a snake passed over the plant, its abdomen would spontaneously open up.

⁶⁶⁰ A number of species are used, the main one being *Glycyrrhiza uralensis* Fisch.

man or water mixed with earth, precisely the kind of liquid that was one of the causes of the toxicity of mushrooms. It is interesting to note that the principal remedy that the author recommends combines the two principles. He writes that each year, during the last month of the year, he makes the following preparation that serves as an antidote to mushroom poisoning. He takes a length of bamboo with a node at each end, retaining the nodes.⁶⁶¹ He strips it of its covering and makes a hole in the upper part. Having reduced some liquorice to powder, he inserts it into this bamboo receptacle which he stops up using a 'needle' cut from the stalk of a leaf from a banana tree. He plunges the bamboo into a manure ditch and leaves it there for forty-nine days. He withdraws it at the spring equinox (*li chun* 立春) and leaves to dry in the shade. The antidote is what is contained between the two bamboo nodes.

(iv) Toxicity

I think the question of toxicity deserves some reflection. As we can see, for this author it may originate in two ways, the one from nature, the other through contamination. In both cases, snakes and earth play an important role. As Yu Cheng 俞成 reports in a collection of notes, the preface of which is dated 1200, entitled *Ying xue cong shuo* 螢雪叢說 (Collection of the Sayings of a Poor Scholar),⁶⁶² 'bad mushrooms in the summer and the autumn are the product of the *qi* of bad snakes and other creatures'. The semantic field of the term *chong* 蟲⁶⁶³ that I have chosen to translate as 'creatures' includes invertebrates, 'insects' in the popular sense of the term, but also other creeping animals such as snakes and toads. This reminds us of 'toadstool', the generic English term that is applied only to 'bad' mushrooms. Neither in Chinese nor in French, for example, does such a category exist, for in these two languages the generic terms apply equally to both edible mushrooms and poisonous ones. However, poisonous mushrooms are closely linked to an eminently negative chthonic character that is manifest in the 'thick liquids' of the earth and excrement, in the presence of tombs and, last but not least, in snakes. We also notice that antidotes operate on the same register but in the opposite position. For the author of this collection the panacea is obtained thanks to a percolation of manure, while other authors recommend decantations of muddy water or remedies used for snakebites.

Where the toxicity of mushrooms is concerned, a number of constants appear in the relevant literature. One could produce an exhaustive list of the characteristic features of this category. An initial interesting point is that toxicity is recognised as a

⁶⁶¹ *Wu xun pu*, 5a. This is 'hairy bamboo', *mao zhu* 毛竹 (*Phyllostachys pubescens* Mazel ex H. de Lehaie), the stem of which may be as long as between thirteen and twenty-five metres.

⁶⁶² The literal translation of the title is 'Collection of sayings about snow and fireflies', an allusion to two poor scholars, one of whom, during the night, would read by the light of fireflies placed in a gauze bag and the other one, in the winter, would read while the snow fell.

⁶⁶³ See Fèvre (1993).

normal, but not intrinsic, phenomenon in all mushrooms. In winter and in spring, mushrooms are free of poison, but they may become poisonous in summer and in autumn. As we have seen, there are a number of diverse causes for toxicity but they are restricted to a limited field: harmful humours in the earth, proximity to tombs, corpses, nests of snakes or even simply contact with them or with venomous creatures. The criteria for recognising toxicity also remain remarkably stable over long periods of time. The mushrooms recognised as poisonous are those which are luminous at night; those which, when boiled; do not cook; and those the light of whose flame produces no shadow. In the local monograph of the *xian* of Gao Yao 高要, in Guangdong, it is advised, in order to verify the innocuous nature of mushrooms, to cut them in two lengthwise.⁶⁶⁴ If the texture, *wen li* 紋理, is uniform, with fibres that are continuous from the top right down to the root, this proves that they are edible. But the means of recognition that is most frequently mentioned is the test of cooking them together with a scrap of reed, a piece of ginger or a small silver object. If this element added to the mushrooms blackens them during the cooking, the mushrooms are said to be bad. A similar procedure used to exist in France. It was recommended to add to the mushrooms a silver spoon or coin or a clove of garlic or an onion; if they turned black during the cooking, this was supposed to reveal that the mushrooms were poisonous. In this case, popular wisdom, when put to the test of experience, has long since revealed the limits of its credibility: 'the poisons that exist in poisonous mushrooms have no effect at all on silver'.⁶⁶⁵ For example, 'a piece of silver does not blacken with fresh phalloid amanite (which is deadly poisonous), but does blacken with any kind of edible mushroom (through the production of silver sulphide)'.⁶⁶⁶

(v) *The characteristics of mushrooms*

As for the very nature of mushrooms, we have come across a number of quite similar hypotheses: they are produced by a *qi* that is perceived as harmful, although the author of the *Wu xun pu* introduces a new view, no doubt connected with his observations, when he declares that all mushrooms are produced by transformations of plants associated with other factors already mentioned by his predecessors. As for the nomenclature, it is not really possible to make general remarks that can claim to be definitive. However, I have noticed that a few terms with generic meanings that vary according to time and place have played a fundamental role in the linguistic economy of this terminology. These are basically *jun* 菌 and *xun* 蕈, and then *zhi* 芝 and *er* 栢, which in association play the same role as the first two, as Fang Yizhi (1611–71) explains.⁶⁶⁷ He writes as follows: 'Zhi er is jun xun 芝栢菌蕈也. Whatever is on the ground, is called zhi 芝, whatever is on wood, is called er 栢'.

⁶⁶⁴ Cited in the *Shou Butsu Rui San, jun shu*, Chapter 5, jun 12a.

⁶⁶⁵ Bernardin (c.1904, p. xxiii).

⁶⁶⁶ Montarnal (1964, p. 11).

⁶⁶⁷ Cited in the *Shou Butsu Rui San, jun shu*, Chapter 5, jun. 7a.

Clearly, for this author, *jun* and *zhi* on the one hand, and *xun* and *er* on the other, are synonymous. Another text indicates that a popular variant for *jun* is *gu* 筍.⁶⁶⁸

To round off this section on generalities, let us see how the various consulted texts classify mushrooms within the category defined by the binomes just cited. The Daoist texts deal with the *zhi* that produce longevity. I have suggested collecting the mushrooms described in the *Tai shang ling bao zhi cao*, adopting a formal approach. Alternatively, these mushrooms could be arranged according to the number of years of longevity that they procure. However, neither of these two kinds of classification is to be found in the text itself. On the other hand, one fundamental characteristic in comparison with other plants is the ‘grassy’ nature of mushrooms, which are considered to be *cao*, ‘grasses’, by all the authors who explain this point. I have already pointed out that the cryptogams that Li Shizhen classes in the category of parasitic trees are not considered by him to be mushrooms. Another common feature is the clear distinction drawn between mushrooms growing on diseased trees or on dead wood, which are generally called *xun*, and those that grow on the ground, which are named *jun*. Apart from the three ranks, mentioned in the last treatise, no doubt by analogy with those of *materia medica* (even though the same attributes are not involved), no classification at a lower level than that of *jun* and *xun* is clearly indicated. A few remarks, in random texts, indicate the existence of a classification of which no more than fragments are cited. For instance, on the subject of *mai xun* 麥蕈, Chen Renyu 陳仁玉 writes that it is a *bei fang mo gu* 北方摩姑, a ‘mushroom of the north’. On the subject of *fu jin* 麩筋, Pan Zhihuan writes that it belongs to the category of ‘mushrooms with paste feet’, *mian jiao xun lei* 麵腳蕈類, without there being any other mention of this kind of mushroom in any other text. The category of ‘mushrooms in the shape of the character *ting*’ seems to me to be more explicit. Particularly interesting is the *mo gu xun* 磨菰蕈 category in Pan Zhihuan. It contains two kinds of mushroom with particular shapes: club-topped mushrooms (‘chicken drumsticks’) and morels (‘sheep’s intestines’). But it is Wu Lin who, in the *Wu xun pu*, produces the most structured system. Under the principal entry *e zi xun* 鵝子蕈, ‘goose egg mushroom’, he cites four names of mushrooms considered to belong to the same category but of different colours in the case of the first three and smaller and of a different colour in the case of the last:

fen e zi 粉鵝子, ‘goose eggs of flour’, the white ones;
huang e zi 黃鵝子, ‘yellow goose eggs’, the yellow ones;
hui e zi 灰鵝子, ‘ash coloured goose-eggs’, the black ones; and
huang ji luan xun 黃雞卵蕈, ‘yellow hen’s egg mushrooms’.

Similarly, in the rubric devoted to the *lei jing xun* 雷驚蕈, he cites a few other related kinds:

wu lei jing 烏雷驚, ‘black fear of thunder’;

⁶⁶⁸ According to the *Fuzhou fu zhi*, cited in the *Shou Butsu Rui San*, *jun shu*, Chapter 8, *hong ku* 2b.

hong jiang wu xun 紅欄烏蕈, 'black mushroom with red pleats', which, at the start of their growth are called 'little mushrooms', *xun zi* 蕈子; and *huang lei jing* 黃雷驚, 'yellow fear of thunder' or 'pine flower mushrooms', *song hua jun* 松花菌.

Now, after this presentation of the sources and their contents, we must try to work out the meaning of the names listed above, which are in many cases very graphic.

(vi) *An attempt at determination*

Mycologists and mycophages mycophiles are well aware of the difficulty of identifying mushrooms simply on the basis of apparent morphological characteristics. In the task of identification that I have undertaken, solely using written evidence, the task has been rendered even more risky – quite apart from the intrinsic impossibility of obtaining spores – on account of the very different kinds of information supplied from one passage to another and one text to another. Furthermore, the names which, in research work into ancient Chinese botany, often provide such precious additional help are in this case practically useless since the standard nomenclature of mushrooms in modern Chinese essentially takes the form of a collection of scholarly names recently created and in many cases based on Latin binomes. Very few correspondences can be established between the terms that appear in the ancient texts and those to be found in modern monographs. In the rare cases where similar terms are used, they do not necessarily refer to the same mushrooms (see the case of *mo gu*). The above remarks will show that I make no claims that the solutions that I propose are definitive; besides, for some terms I make no suggestions at all since such indications that are at my disposal do not justify any reasonable speculation. I am able to be categorical in no more than a few cases. Meanwhile, the abundant use of 'perhaps' or of other rhetorical ploys clearly testifies to my doubts. I am sure that ethnobotanical enquiries in the native areas of the authors of monographs could provide precious aid for the task of relating names to the natural objects that they designated. Nevertheless, despite the limitations inherent to the subject where historical research is concerned, I shall propose this initial attempt at a synthesis in the hope of encouraging others to continue the task with better tools at their disposal.

The basic principle for this investigation has been to follow as closely as possible the descriptions and remarks of the authors of texts, particularly where names are concerned. For the names, where possible I have taken into consideration the Japanese terms used by the compilers of the *Shoubutsu Rui San* as equivalents of the Chinese names. However, here too it is clear that the modern Japanese nomenclature bears little relation to that of the 18th century. I have also taken account of the results of the research work into the names of plants in the *Ben cao gang mu* undertaken by Bernard E. Read (1936) and Kitamura Shiro

(1985).⁶⁶⁹ As will be understood, in this attempt at determining names, my basic method has been to try to understand and interpret on the one hand the texts and on the other a great number of the images that are to be found in various modern works on mycology that focus on the mushrooms of China, Japan and Europe, and then, when a possible solution seems to be found, I have looked for a closer approximation in other Chinese works. The scientific names indicated to make it possible to recognise the plants cited in the Chinese texts also pose a problem in that the mycological nomenclature is rendered particularly complex by the existence of numerous synonyms which vary from one author to another. I have decided to follow the choices of the authors of the works that I have consulted. What can be read below is certainly also the result of an intuitive, subjective approach on my part, and I look forward to receiving any criticisms and suggestions that my readers may offer.

The Chinese names as a whole are arranged in alphabetical order of the name cited as the principal name in the texts of reference that are indicated in brackets.

Bie po zi xun 癯婆子蕈 ‘emaciated old woman mushroom’, also called *lao po* 老婆, ‘old woman’ (*Wu xun pu*).

The resemblance that is indicated suggests to me that this may be *Cantharellus lutescens* (Pers.) Fr.⁶⁷⁰ However, I cannot see any grotesque aspect to these *Cantharellus* mushrooms.

Cai hua xun 菜花蕈, ‘mushroom of flourishing cabbages’ (*Wu xun pu*). Unknown.

Cha ke xun 茶棵蕈, ‘tea plant mushroom’ (*Wu xun pu*). Unknown.

Chou gao xun 稠膏蕈, ‘thick cream mushroom’ (*Jun pu*). The description that the text gives of this mushroom, which as it begins to grow is compared to a yellow pearl, with a sweet taste, which then opens up in the shape of an umbrella, leads me to consider it to be an agaric, *Amanita caesarea* (Fr. ex Scop.) Qué. ⁶⁷¹ (Fig. 143).

Deng tai xun 燈臺蕈, ‘lampstand mushroom’, still called *ji jiao xun* 雞腳蕈, ‘chicken foot mushroom’, or *ding xun* 丁蕈, ‘T-shaped mushroom’ (*Wu xun pu*). The puny appearance, the long stem, the cap shaped like an umbrella, and the yellowish colour put one in mind of *Marasmius oreades* (Bolt.) Fr. ⁶⁷²

Di er 地耳, ‘earth ears’, also called *di ta gu* 地踏菰, ‘rammed earth gu’ (*Guang jun pu* and *Ben cao gang mu*). Considered to belong to the genus *shi er* 石耳. ⁶⁷³ No doubt the aspect and structure of these ‘earth ears’, identified as nostoc, *Nostoc commune* Vaucher, ⁶⁷⁴ have caused them to be assimilated to mushrooms.

Duo cai 舵菜, ‘rudder vegetable’ (*Guang jun pu* and *Ben cao gang mu*). Read considers this ‘vegetable’ to be a mushroom, which he names ‘rudder fungi’ without any

⁶⁶⁹ However, the most recent, a work by Chen Guiting (1992), has nothing new compared to these two sources.

⁶⁷⁰ Anon. (1977a, pp. 28–9). Liu Bo (1964, p. 107). ⁶⁷¹ Cf Liu Bo (1964, p. 72).

⁶⁷² Zhang Guangya (1984, p. 141). Anon. (1977a, p. 68 and Plate 18).

⁶⁷³ *Di er yi shi er zhi shu* 地耳亦石耳之屬. ⁶⁷⁴ Anon. (1977, p. 2311, no 4800), Kitamura Shiro (1985, p. 409).



Fig. 143. Caesar's mushroom, *Amanita caesarea* (Fr. ex Scop.) Quél., now named *hong e gao* 紅鵝膏, from Bernardin (c.1904, pp. 34-5, Plate v).

further explanation.⁶⁷⁵ It is no doubt a marine alga since it develops on the rudder of seagoing vessels.

E gao xun 鵝膏蕈 (*Jun pu*). This is certainly an amanite, possibly *Amanita ovoidea* (Bull. ex Fr.) Quél., today called *luan gai e gao* 卵蓋鵝膏, 'goose fat with ovoid cap'.⁶⁷⁶ The possible confusion with *du xun* 杜蕈, 'pear tree mushroom', which are deadly poisonous, amid which it grows, reinforces this hypothesis. These *du xun* could be other amanites, *Amanita* sp.

E zi xun 鵝子蕈, 'goose egg mushroom'; popular synonym with the same meaning, *e luan xun* 鵝卵蕈 (*Wu xun pu*). ???

Fen tuan xun 粉團蕈, 'ball of flour mushroom', also called *yu xun* 玉蕈, 'jade mushroom' (*Wu xun pu*). ???

Fo shou xun 佛手蕈, 'Buddha's hand mushroom', synonyms *sao zhou xun* 掃帚蕈, 'broom mushroom'; *deng cao xun* 燈草蕈, 'reed wick for oil lamp mushroom'; or *cong guan xun* 蔥管蕈, 'stem of spring onion mushroom' (*Wu xun pu*). This very particular tufted habit described by each of the cited terms suggests to me that these various names refer to club-top mushrooms of the *Clavaria* genus, possibly *Clavaria vermicularis* Fr.⁶⁷⁷ (Fig. 144) or even *Clavaria botrytis* Pers. (Fig. 145).

Fu jin 麩筋, bran muscle (*Wu xun pu*). *Clavaria* sp.

Ge ru 葛乳, *Pueraria* milk (*Guang jun pu*) = *ge hua cai* 葛花菜 (*Ben cao gang mu*). I do not subscribe to the identification of this species with *Balanophora japonica* Makino, even with the reservations that are expressed by Shirō Kitamura,⁶⁷⁸ for the upright habit of the mushrooms of this species contradicts the elements of the description to be found in the text of the *Guang jun pu*, which states that the mushroom 'emerges spread over the ground', *yung chu di shang* 涌出地上.

Gu shu xun 穀樹蕈, 'paper mulberry tree mushroom' (*Wu xun pu*). These small, puny mushrooms have a long stalk and a thin cap that does not form an umbrella. They are yellowish in colour and have a fresh taste but are rather leathery. They grow in the second and third months. A synonym is *huang er xun* 黃耳蕈, 'mushroom with a yellow ear'. ???

Guan jun 萵菌, 'reed mushrooms' (*Guang jun pu*) = *guan lu* 萵蘆 (*Ben cao gang mu*). The first of the Japanese names given as an equivalent for the Chinese name in the *Shoubutsu Rui San* is *shimeji*. This name provides an interesting clue. For one thing, for certain Japanese mycologists today it corresponds to the name of a botanical genus, *Lyophyllum*,⁶⁷⁹ that Roger Heim considers to be a sub-genus of *Tricholoma* and that he defines as 'Tricholomas with the habit of *Clitocybes*'.⁶⁸⁰ In the past, what corroborates the above remarks is that *shimeji* was recognised as designating a botanical species, *Tricholoma shimeji* Kawam., a name

⁶⁷⁵ Read (1936, p. 261, no 836). ⁶⁷⁶ Liu Bo (1964, p. 73).

⁶⁷⁷ Zhang Guangya (1984, Fig. 87, p. 296), Imazeki Rokuya, Hongo Tsuguo and Tsubaki Keisuke (1970, Plate 16, 4 and 5, p. 32).

⁶⁷⁸ Kitamura Shiro (1985, p. 407).

⁶⁷⁹ Imazeki Rokuya, Hongo Tsuguo and Tsubaki Keisuke (1970, pp. 63-4).

⁶⁸⁰ Heim (1969, p. 473).

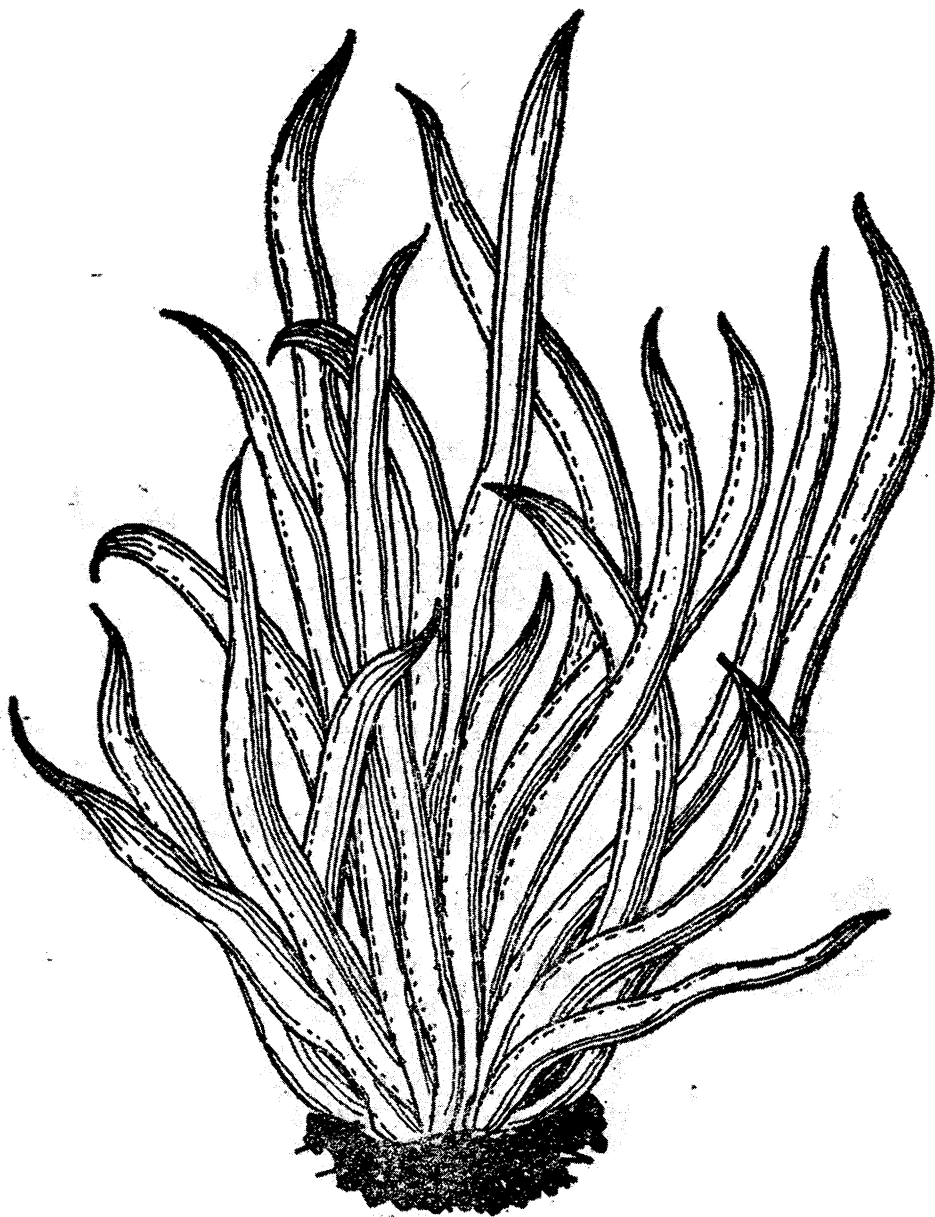


Fig. 144. *Chong xing shan hu* 蟲形珊瑚, 'insectiform coral' (*Clavaria vermicularis* Fr), from Zhang Guangya (1984, p. 296, Fig. 87).



Fig. 145. *Sao zhou xun* 掃帚蕈, 'broom mushroom' (*Clavaria botrytis* Pers.), from Jia Zuzhang and Jia Zushan (1955, p. 1342, Fig. 2307).

synonymous with *Tricholoma conglobatum* Vitt.⁶⁸¹ It remains difficult to consider this identification certain if one takes account of the ecological conditions of the *guan jun* and those of mushrooms of the *Tricholoma shimeji* species. To indicate this uncertainty, I prefer to identify *guan jun* as *Tricholoma sp.*

Gui bi 鬼筆 'ghost brushes'. They are called 'flower born in the morning, withered in the evening', *chao sheng mu lo hua* 朝生暮落花. Children call them 'dogs' piss', *gou ni* 狗溺. They belong to the category of 'ghost canopies', *gui gai*, but do not form an umbrella (*Guang jun pu*). These 'ghost brushes' are representatives of the *Phallus* genus and, more particularly, *Phallus impudicus* L. ex Pers. (Fig. 146).⁶⁸²

Gui jun 鬼菌, 'ghost mushroom'; other names are 'ghost canopy', *gui gai* 鬼蓋; 'ghost umbrella', *gui san* 鬼繖; 'ghost home', *gui wu* 鬼屋. Yet other names are 'earth canopy', *di gai* 地蓋, and also 'earth ling' *di ling* 地苓 (*Guang jun pu* and *Ben cao gang mu*). The term is still used today and now designates the *Coprinus* genus. According to Li Shizhen, the *di ling* are *gui gai* of a whitish yellow colour.

He xun 合蕈, synonyms *xiang gu* 香菰 (*Jun pu*), *tai xun* 台蕈 (*Ben cao gang mu*). Mushroom described as 'oak lentin' or 'perfumed mushroom', *xiang gu*, known also by its Japanese name, *shiitake*, a much prized ingredient in Chinese and Japanese cooking today, currently sold after being dried. *Lentinus edodes* (Berlk.)

⁶⁸¹ Liu Bo (1964, p. 75).

⁶⁸² Liu Bo (1978, pp. 254-5).

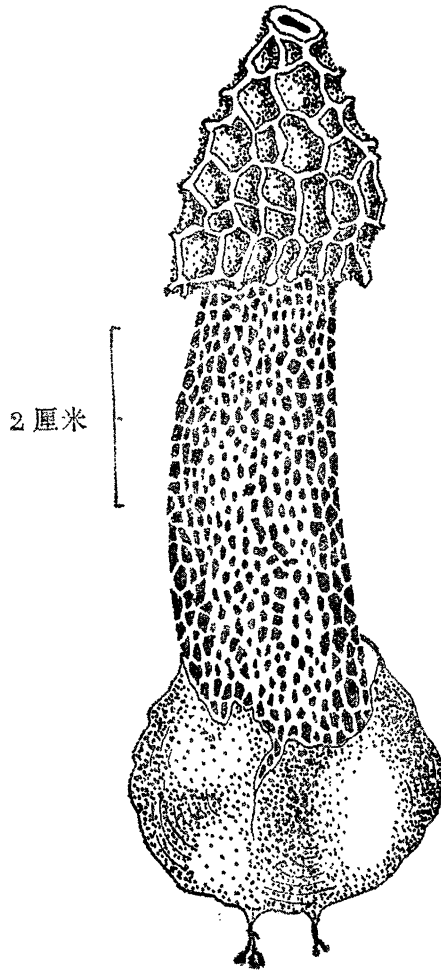


Fig. 146. *Bai gui bi* 白鬼筆, 'white ghost brush' (*Phallus impudicus*), from Liu Bo (1978, p. 255, Fig. 100).

Sing. This is also the conclusion reached by the authors of a book on the history of the cultivation of this mushroom (Fig. 147).⁶⁸³

Hei jun 黑菌, black mushrooms that grow on dung (*Guang jun pu*). These may be *Cyathus stercoreus* (Schw.) de Ton.⁶⁸⁴

Hou tou 猴頭, 'monkey's head' (*Wu li xiao shi*). This term, cited by Fang Yizhi together with the names of three other mushrooms which, judging by the two that I have identified (the drum-stick clavaria and the morel), have very

⁶⁸³ Zhang Shoucheng and Lai Minnan (1993, pp. 102–3).

⁶⁸⁴ Liu Bo (1978, pp. 264–5).

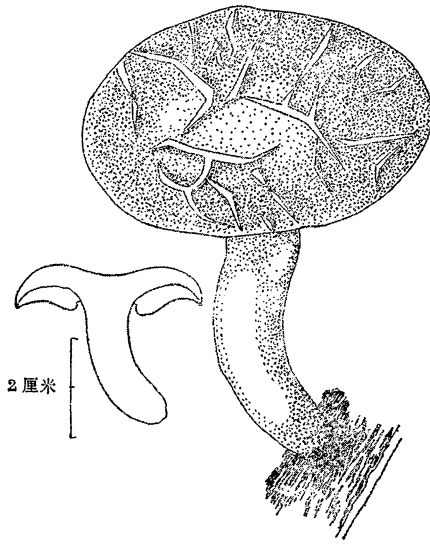


Fig. 147. *Xiang gu* 香菇 (*Lentinus edodes*), from Liu Bo (1978, p. 202, Fig. 77).

particular shapes, possibly designates a hydnum, *Heridium erinaceus* (Bull. ex Fr.) Pers. (= *Hydnum erinaceus* Bull. ex Fr.), today known as *hou tou jun* 猴頭菌,⁶⁸⁵ or else *hou tou mo gu* 猴頭蘑菇,⁶⁸⁶ 'monkey head mushroom', or even simply *hou tou* 猴頭 'monkey head' (Fig. 148).

Huai er 槐耳, 'Sophora ears', also called *huai jun* 槐菌, 'Sophora mushroom', and also, like the mulberry tree, called 'chicken' (*ji* 雞), or 'butterfly' (*e* 蛾) (*Guang jun pu*, *Ben cao gang mu*). Possibly a species of *Auricularia*.⁶⁸⁷

Huang xun 黃蕈, synonym (pop.) *huang zuan xun* 黃鑽蕈 (*Jun pu*). Its proximity in the text to *yu xun* 玉蕈 and the characteristic features that are cited, namely the yellowish colour, rather leathery texture and an unpleasant smell, incline me to favour *Russula foetens* (Pers.) Fr.⁶⁸⁸ The other kind, slightly more leathery, called *huang tun* 黃鈍, 'yellow piglet', may also be a russula, *Russula sp.*

Ji song xun 雞縱蕈, 'chicken mushroom' (*Guang jun pu*). *Ji song* = *ji rou* 雞肉 (*Ben cao gang mu*). The identification of this mushroom by Read,⁶⁸⁹ followed by Kitamura, with a kind of club-top mushroom, *Clavalaria corniculata*, is improbable given that the text of the *Ben cao gang mu* states clearly that it is a 'ding mushroom'; that is to say, a mushroom in the shape of the character *ding* 丁, or a capital T, which has a 'long stem and an umbrella head'. The term may designate several species of mushroom that have a similar shape and are

⁶⁸⁵ Chen Shouchang (1988, p. 53); Liu Bo (1978, p. 76). ⁶⁸⁶ Anon. (1977a, p. 30).

⁶⁸⁷ Sallet (1932, p. 28). ⁶⁸⁸ Liu Bo (1978, p. 155); anon. (1975, p. 84, *chou huang gu* 臭黃菇).

⁶⁸⁹ Read (1936, p. 277, no 828).

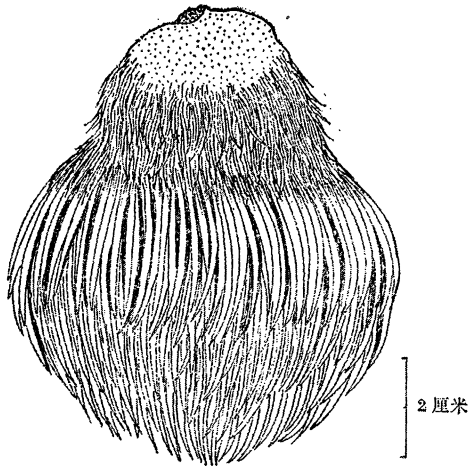


Fig. 148. *Hou tou* 猴頭, 'monkey head', from Liu Bo (1978, p. 76, Fig. 27).

particularly appreciated for their taste, in particular *Collybia albuminosa* (Berk.) Pech.⁶⁹⁰ (Fig. 149) and *Mycena microcarpa* (Berk. et Br.) Pat.⁶⁹¹ (= *Termitomycetes albuminosus* (Berk.) Heim),⁶⁹² a parasite on termitaries (Fig. 150). This last possibility is confirmed by two synonyms of *jī song*, cited in the *Guang qun fang pu* 廣群芳譜, *yī song* 蟻縱 ('chicken of ants') and *yī duo* 蟻奪 ('termitary ravisher').⁶⁹³

Jiang huang xun 薑黃蕈, 'turmeric mushroom' (*Wu xun pu*). The description suggests to me *Cantharellus* mushrooms, *Cantharellus cibarius* Fr., or perhaps *Cantharellus minor* Peck.⁶⁹⁴

Ju pi xun 橘皮蕈, 'orange peel mushroom' (*Wu xun pu*). Perhaps a russula, *Russula* sp.

Lei jīng xun 雷驚蕈, 'fear of thunder mushroom', synonyms *dai sha* 戴沙, 'sand carrier', *shi xun* 石蕈, 'stone mushroom' (*Wu xun pu*). I think these terms may be synonyms of what Pan and Li Shizhen call *shi er* 石耳, 'stone ears', *Umbilicaria esculenta* (Miyoshi) Minks (Fig. 151).⁶⁹⁵

Lei xun 雷蕈, 'thunder mushrooms' (*Guang jun pu*). ??? Wang Xilou, in the *Jiu huang ye pu*, reports that the *lei sheng jun*, 'mushrooms born from thunder', grow in summer and autumn after stormy rains, in dense grass. He adds that they resemble *mo gu*, even in taste. If it is the case that both these authors are writing about the same thing, these mushrooms would resemble *Clavaria* drumsticks.

⁶⁹⁰ Anon. (1977a, p. 95), Zhang Guangya (1984, p. 25). ⁶⁹¹ Zhang Guangya (1984, p. 115).

⁶⁹² Chen Shouchang (1988, p. 113). ⁶⁹³ Cited in *Shou Butsu Rui San* (*jun shu, juan 9, jī song*, 3a).

⁶⁹⁴ Zhang Guangya (1984, pp. 48–9). ⁶⁹⁵ Anon. (1977b, Fig. 1203).

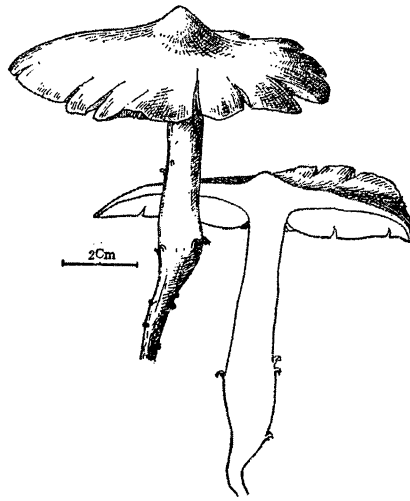


Fig. 149. *Ji song* 雞縱 (*Collybia albuminosa* (Berk.) Petch.), from anon. (1977a, Hunan, p. 96, Fig. 50).

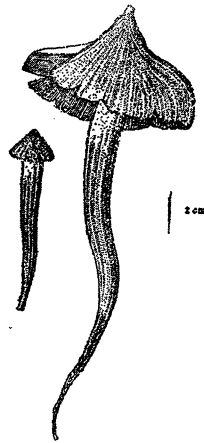


Fig. 150. *Ji song jun* 雞縱菌 (*Termitomyces albuminosus* (Berk.) Heim), from Chen Shouchang (1988, p. 113, Fig. 44).

Liu er 柳耳, 'willow ears' (*Guang jun pu*). This could be *Daedaleopsis confragosa* (Bolt.) Schröt, 'a distinctive bracket fungus peculiar to willows. It is hard to think of other such fungi associated with willows'.⁶⁹⁶

⁶⁹⁶ I thank one of the readers of the manuscript for this important suggestion.

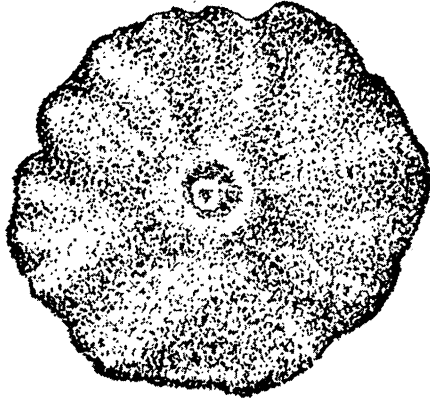


Fig. 151. *Shi er* 石耳, 'stone ear' (*Umbilicaria esculenta*), from anon. (1977b, no 1203, p. 582).

Ma bo 馬勃 ('horse vetches') (*Guang jun pu*). a reading of the *Ben cao hui yan* 本草彙言 (c.1624), by Ni Zhumo 倪朱謨,⁶⁹⁷ provides precious information for recognising what this term designates.⁶⁹⁸ This author classes *ma bo* in the grasses, *cao*, section, under the 'mosses' category, *tai cao lei* 苔草類.⁶⁹⁹ The characteristics that he mentions for this grass are the following. It grows in humid places and on rotting wood. In the fifth and sixth months it opens up, revealing something empty and mauve-brown in colour in the shape of a dog's liver. The largest ones are like a bushel, the smallest like a fist. If one prods them with a finger a dust escapes. These details suffice for one to see that *ma bo* presents a rare case in which an ancient mushroom name with its implicit folk generic meaning has been readopted into the scientific nomenclature of modern Chinese. Today this term designates mushrooms that all have a similar shape, that of a ball of variable dimensions, but that belong to different genera, such as *Lycoperdon*, *ma bo* 馬勃; *Bovistella*, *ma bo*; *Mycenastrum*, *si ma bo* 絲馬勃, 'ma bo of silk'; *Lasiophora*, *mao qiu ma bo* 毛球馬勃, 'ma bo ball of hairs'; *Calvatia*, *tu ma bo* 禿馬勃, 'bald ma bo'; *Scleroderma*, *ying pi ma bo* 硬皮馬勃, 'ma bo with tough skin' (Fig. 152).

Mai xun 麥蕈, *mai dan xun* 麥丹蕈 (*Jun pu*). I think that this term designates a truffle of reddish colour that appears in sandy soils beneath pine trees, *Rhizopogon rubescens* Tul.⁷⁰⁰

⁶⁹⁷ Ni Zhumo (1996, *juan* 7, 43a). A native of the present-day town of Hangzhou, in Zhejiang. Active under the Ming, in the Wan Li and Tian Qi periods (1573–1627). See Zheng Jinsheng, 'Nei rong ti yao', in Ni Zhumo (1996).

⁶⁹⁸ Long Bojian (1957, p. 56).

⁶⁹⁹ Moss should be understood, here, in the wider sense that includes algae, lichens and mushrooms.

⁷⁰⁰ Jia Zuzhang and Jia Zushan (1955, Fig. 2284).

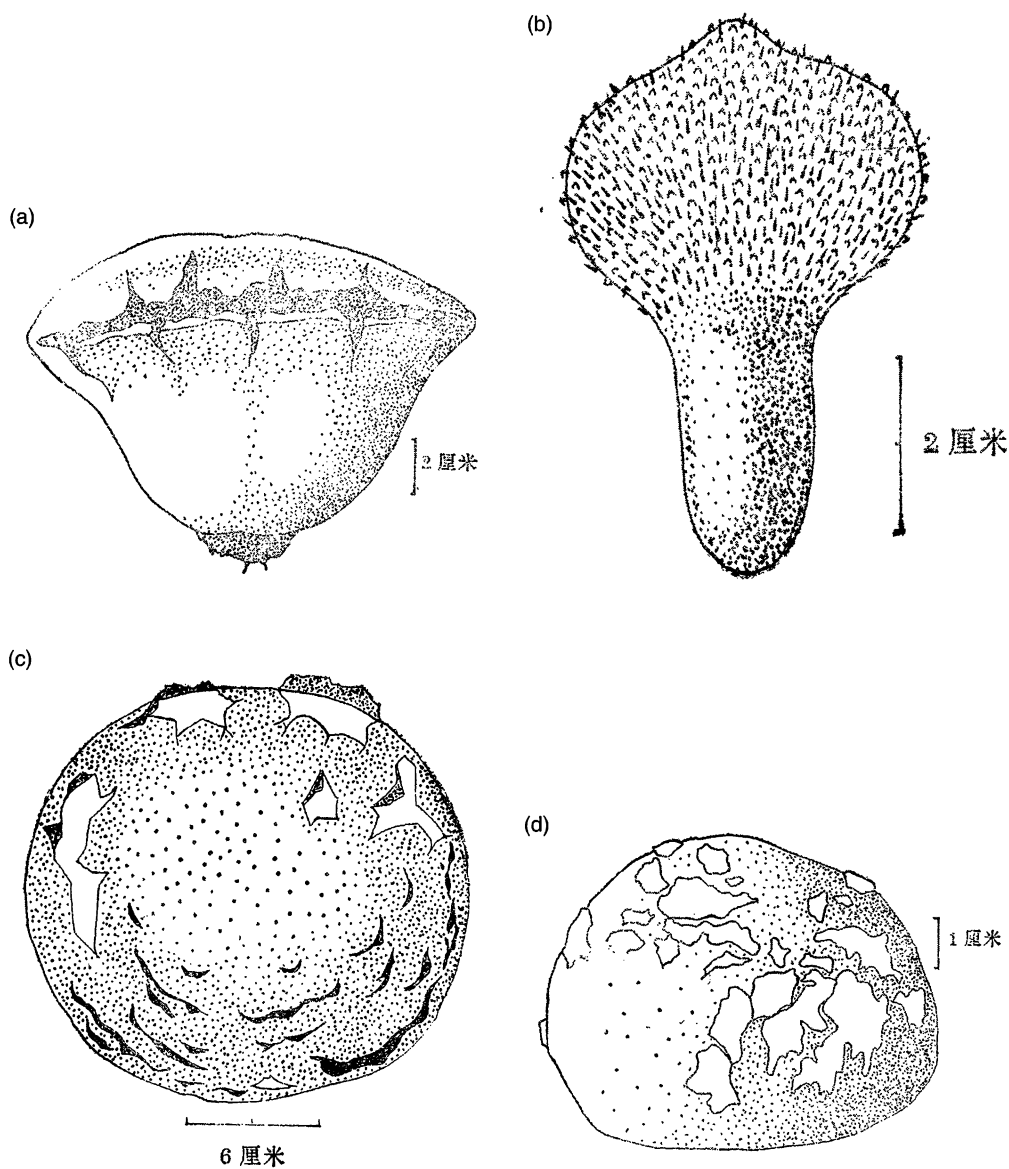


Fig. 152. Examples of a folk genus: *ma bo* 馬勃, 'puffball', which includes species of the following botanical genera: (a) *Calvatia*; (b) *Lasiophora*; (c) *Lycoperdon*; and (d) *Mycenastrum*, from Liu Bo (1978, pp. 235-49).

Mao chai xun 茅柴蕈, 'brushwood mushrooms' (*Wu xun pu*); another name is *hong jian xun* 紅褶蕈, 'mushrooms with red pleats'. The description evokes *Volvariella volvacea* (Bull. ex Fr.) Sing.⁷⁰¹

⁷⁰¹ Liu Bo (1964, p. 84).

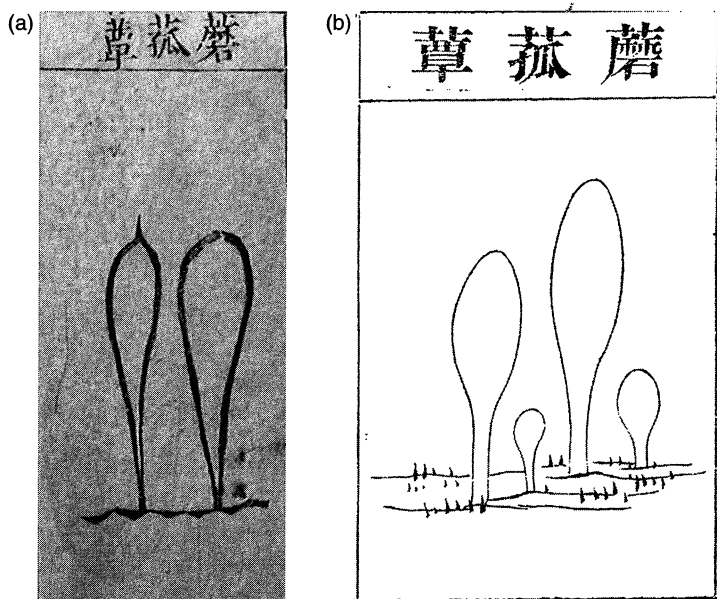


Fig. 153. *Mo gu xun* 蘑菰草 (note that the illustrations in *Ben cao gang mu* for this term bear no resemblance to an agaric): (a) *Ben cao gang mu* (1596, *cāi bù tú juǎn zhī shàng, shuǐ cài lèi fù tú* 菜部圖卷之上, 芝栴類附圖, 57b), cf Li Shizhen (1975–81, Volume 3, *fù tú*, p. 31); (b) *Ben cao gang mu* (1885, *Tu, juǎn zhōng* 卷中, 37b).

Mei shun xun 梅樹蕈, 'Japanese apricot tree mushroom' (*Wu xun pu*). ???

Mian jiǎo xun 面腳蕈, 'paste foot mushroom' (*Wu xun pu*). ???

Mo gu xun 蘑菰蕈 = (pop.) *jī tuǐ mó gu* 雞腿磨菰, 'chicken thigh' *mo gu* (*Guang jun pu*) = *rou xun* 肉蕈 (*Ben cao gang mu*). This mushroom has been identified as an agaric, *Agaricus campestris* Fr.⁷⁰² However, Li Shizhen's reading of the text of the *Guang jun pu* leads me to question that identification. The fact is that the description suggests nothing remotely like a field agaric. The comparison to the buds of *Hosta*⁷⁰³ and chicken thighs clearly refers to some longish round object in the shape of a club, as is confirmed by the illustrations in three separate editions of the *Ben cao gang mu*, each with its own distinct iconography (Fig. 153).⁷⁰⁴ There is no possibility that these might be agarics, even if the modern name, *mo gu*, is precisely that of the field agaric in Chinese. So it seems to me more rational to follow the decision made by Read, following Loureiro,⁷⁰⁵ and to consider these mushrooms to be drumstick *Clavarias*,

⁷⁰² Kitamura Shiro (1985, p. 408) and Chen Guiting et al. (1992, p. 1424).

⁷⁰³ *Yu tsan* 玉簪, *Hosta sieboldiana* Engl. (Jia Zuzhang and Jia Zushan 1955, Fig. 1849).

⁷⁰⁴ For the numerous editions of the *Ben cao gang mu*, three sources for the illustrations have been recognised: the editions of 1596, 1640 and 1885. There are considerable differences between the representations of certain mushrooms in the first and the last of those editions, but the drawings of the *mo gu xun* remained remarkably similar.

⁷⁰⁵ Loureiro (1790, p. 696).

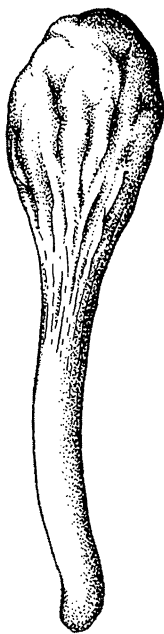


Fig. 154. Pestle-shaped coral, *Clavaria* sp.; for example, *Clavaria pistillaris*, *Clavaria fusiformis*, from Heim (1969, Fig. 130, B).

Clavaria pistillaris L.⁷⁰⁶ (= *Clavariadelphus pistillaris* (Fr.) Donk⁷⁰⁷) (Fig. 154). The description in the *Ben cao pin hui jing yao* supports this hypothesis:

They are two to three inches high, hollow, light and fragile. Yellowish in colour, they emerge during the fifth and sixth months in damp places. Everybody eats them in soups. They have a very fresh and delicious taste but one should not eat too many as they agitate one's *qi* (*dong qi* 動氣) and then one falls ill.⁷⁰⁸

Mu er 木耳, 'wood ear', synonyms *mu er* 木柄, *mu jun* 木菌, *mu song* 木縱, *shu ji* 樹雞, *mu e* 木蛾 (*Guang jun pu* and *Ben cao gang mu*). *Mu er* designates the parasites of a variety of trees. Today the Chinese name corresponds to a precise botanical species, *Auricularia auricula* (L. ex Hook.) Underw. I imagine that for the two authors concerned, it is a matter of a generic term that certainly covers various species, including *Auricularia*.

⁷⁰⁶ Read (1936, p. 278, no 829). ⁷⁰⁷ Imazeki Rokuya, Hongo Tsuguo and Tsubaki Keisuke (1970, p. 33).

⁷⁰⁸ See Liu Wentai (1982, p. 878). The *mo gu* 蘑菇 are classed in the medium rank of the section on vegetables, Chapter 39, *Cai bu zhong pin* 菜部中品. They are thus defined as 'vegetable grasses (*cai zhi cao* 菜之草) that grow upright (*zhi sheng* 直生), of the mushroom genus (*xun zhi shu* 蕈之屬也)'.

Mu jun 木菌, 'wood mushroom', synonyms *mu nou* 木櫛,⁷⁰⁹ *mu song* 木縱, 'wood chicken'; *shu ji* 樹雞, 'tree chicken'; *mu e* 木蛾, 'wood butterfly' (*Guang jun pu*).

The comparison to a shell leads me to think of the *Pleurotus*. The references to the organoleptic qualities, 'tenderness and unctuousity', support this hypothesis.

Pleurotus sp., maybe *Pleurotus sapidus* (Schultz.) Sacc.⁷⁰⁹

Nai zhi xun 奶汁蕈, 'milk mushroom' (*Wu xun pu*). *Lactarius* sp.?

Qing mian zi xun 青面子蕈, 'mushroom with dark green face' (*Wu xun pu*). The 'face', or cap, bears dark green and white spots. When the umbrella is deployed, these are called *qing mian zi* 青面子, 'dark green face'. The mushroom thus named certainly corresponds to what Chen Renyu calls *yu xun* 玉蕈, a russula, *Russula virescens* (Schaeff.) Fr.⁷¹⁰ The following terms probably designate other russulas: *bai mian zi* 白面子, 'white face', *Russula* sp.; *hong mian zi* 紅面子, 'red face', *Russula lepida* Fr.;⁷¹¹ *zhe mian zi* 赭面子, 'ochre face', familiarly called *yan mian zi* 黥面子, 'pock-marked face', *Russula mustelina* Fr.⁷¹²

Rou xun 肉蕈, 'fleshy mushrooms' (*Ben cao gang mu*, *Wu li xiao shi*) = *shu ji* 樹雞 'tree chicken'. This term probably designates several kinds of mushroom. On the one hand, as a synonym of *mo gu xun* 磨菰蕈, it designates a mushroom growing on the ground, a drumstick *Clavaria*, but it seems to me also to designate a mushroom or group of mushrooms that grow on trees. A note by Fang Yizhi supports this hypothesis, for he writes that there are 'fleshes of elm', *yu rou* 榆肉, that are excrescences from elm trees, *yu ying* 榆癭.⁷¹³ Basing his remarks on the *Shuo pu shi yu* 說圃識餘, Lai Yuancheng 來元成 (Lai Jizhi 來集之, *jìn shì* between 1628 and 1644), writes in the *Bo xue hui shu* 博學彙書 (Compendium of Extensive Knowledge), on the subject of *shu rou* 樹肉, that it comes from the Wu Tai Shan, is shaped like a pear, and has a texture (*zhi* 質) that resembles jade. It is cooked in water; as soon as this boils, it is removed from the water, pressed under a stone to remove the water and eaten. It is as refreshing as cooked pork.⁷¹⁴

Sang er 桑耳, 'mulberry tree ear', is also called *nou* 櫛; *e* 蛾, 'butterfly'; *ji* 雞, 'chicken'; *huang* 黃, 'yellow'; *chen* 臣 'minister'; and also *sang shang ji sheng* 桑上寄生, 'mulberry tree parasite' (*Guang jun pu*, *Ben cao gang mu*). The fact that these mushrooms are said to 'crown mulberry trees' and are of a yellow colour may suggest that they are armillaries, *Armillaria* sp.

Sang shu jun 桑樹蕈, 'mulberry tree mushroom' (*Wu xun pu*). ???

Shan er 杉耳, '*Cunninghamia* ears' (*Guang jun pu*).⁷¹⁵ The remark pointing out that they resemble *jun* 菌 mushrooms suggests that this may be a mushroom with a foot, possibly an *Armillaria mellea* (Vahl. ex Fr.) Quél., a parasite species of *Cunninghamias*.⁷¹⁶

⁷⁰⁹ Anon. (1977a, Hunan, p. 79, and coloured Plate 24). ⁷¹⁰ Liu Bo (1964, p. 73).

⁷¹¹ Anon. (1977a, p. 75).

⁷¹² Anon. (1977a, p. 68 and Fig. 18).

⁷¹³ Fang Yizhi (1995, *juan* 6, p. 34b).

⁷¹⁴ Cited in Shobutsu Rui San (*jun shu* 菌屬, *juan* 6, *yu rou* 榆肉, 2a).

⁷¹⁵ *Cunninghamia lanceolata* Hook. = *C. sinensis* R. Br. (Jia Zuzhang and Jia Zushan 1955, Fig. 2138).

⁷¹⁶ Anon. Hunan (1977, pp. 89–90).

Shan jun 杉菌 (*Ben cao gang mu*). A possible identification of this mushroom, from the Japanese name by which it is translated in the *Shoubutsu Rui San*, is *Pholiota squarrosa* (Fr.) Quél.⁷¹⁷

Shi er 石耳, 'stone ears', also called *ling zhi* 靈芝, 'magic mushrooms' (*Guang jun pu* and *Ben cao gang mu*). In view of the most current meaning of the synonym *ling zhi*, 'magic mushrooms', one might consider identifying them as 'mushrooms of immortality' (*Ganoderma sp.*). However, the detail relating to the need to rid them of grains of sand encourages me to retain another possibility as being the most likely one. Their name is still used today. The identification as *Umbilicaria esculenta* (Miyoshi) Minks⁷¹⁸ is confirmed by the Japanese term *iwatake*,⁷¹⁹ which the *Shoubutsu Rui San* gives as the equivalent of the Chinese name. These mushrooms that possess a perfumed taste and are often most effective against stomach aches therefore seem an excellent 'alicament'.⁷²⁰

Si ji xun 四季蕈 (*Jun pu*). ???

Song xun 松蕈 (*Jun pu*). Without the slightest doubt, this is *Tricholoma matsutake* (Ito and Imai) Sing (Fig. 155).⁷²¹ This mushroom, named *matsutake* in Japanese, copied from the Chinese name, is today the mushroom that is most appreciated by gourmets in Japan. In the autumn they buy it at a very high price whether it is produced locally or imported from China. See *tang xun*.

Tang xun 糖蕈, 'sugar mushroom', synonyms *song xun* 松蕈, 'pine mushroom'; *zhu yu xun* 珠玉蕈, 'pearl jade mushroom' (*Wu xun pu*). The importance attached to this mushroom, its excellence, and the synonym *song xun* suggest that this is *Tricholoma matsutake* (Ito and Imai) Sing. If the other kinds mentioned by the author, the *bai tang xun* 白糖蕈, 'white sugar mushrooms', which are white in colour, and the *huang tang xun* 黃糖蕈, 'yellow sugar mushrooms', which are yellow in colour, are tricholomes, the former might be identified as the species *Tricholoma albo-brunneum* (Pers. ex Fr.) Quél., and the latter as *Tricholoma equestre* (L. ex Fr.) Quél. As for the mushrooms of the other kind named *gan tang xun* 乾糖蕈, 'dry sugar mushrooms', which resemble the *nai zhi xun* 奶汁蕈, 'milk mushrooms', with a white stalk, perhaps these are *Lactarius sp.*

Tian hua xun 天花蕈, 'snow mushroom', still called 'snow vegetable', *tian hua cai* 天花菜 (*Guang jun pu* and *Ben cao pin hui jing yao*). In Chapter 39 of the *Ben cao pin hui jing yao*, *cai pu zhong pin*, 'vegetables section, intermediate rank', at the entry *tian hua* 天花 (p. 878), it is said to be a 'vegetable grass', *cai zhi cao* 菜之草, that grows in a group, *cong sheng* 叢生. This mushroom, which grows in mountain ravines, is five or six inches high and is of varying thickness. On the upper part, there are 'broken gills', *sui ban* 碎瓣, like 'wood ears', *mu er*, but coloured yellow. About ten 'gills', *ban* 瓣, grow in a group from a stem. As large as 'pine flowers', *song*

⁷¹⁷ Kitamura Shiro (1985, p. 407). ⁷¹⁸ Anon. (1977b, Fig. 1203).

⁷¹⁹ Makino Tomitaro (1970, p. 955, no 3817) identifies this term as *Gyrophora esculenta*, Miyoshi, synonym *Umbilicaria esculenta* (Miyoshi) Minks, in Kitamura Shiro (1985, p. 409). The mode of preparation for *iwatake* described in a Japanese dictionary further confirms this choice of mine. See Motoyama Tekishū (1980, p. 46).

⁷²⁰ Motoyama Tekishū (1980, p. 46). ⁷²¹ Zhang Guangya (1984, p. 10).

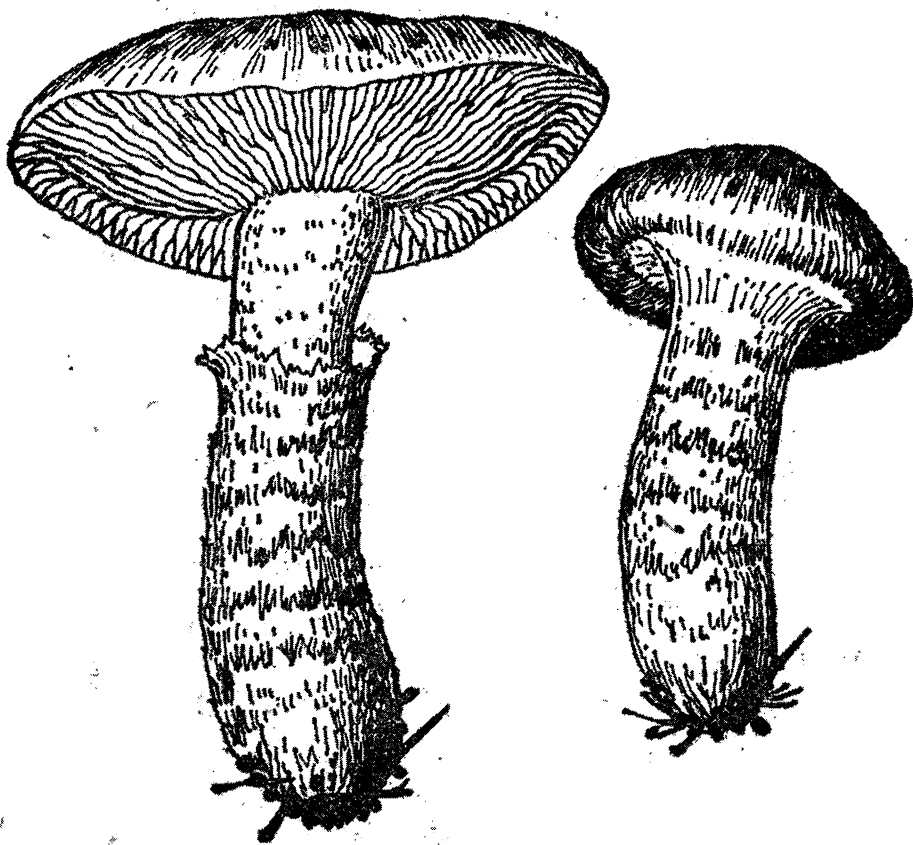


Fig. 155. *Song xun* 松蕈, *song kou mo* 松口蘑 (*Tricholoma matsutake*), from Zhang Guangya (1984, p. 11, Fig. 1).

hua 松花.⁷²² People eat them exclusively as choice vegetables under the name *tian hua cai* 天花菜. Such a description fits a mushroom growing in a colony from a single stalk. The description might put one in mind of pleurotes (*Pleurotus ostreatus* (Fr.) Kummer.,⁷²³ but because of the colour of the cap I incline, rather, to polypores, *Polyporus confluens* (Alb. et Schw.) Fr., or else *Polyporus dispansus* Lloyd.

Tu jun 土菌, 'earth mushrooms' = *tu xun* 土蕈 (*Jun pu*); *di xun* 地蕈, *gu zi* 蕈子, *di ji* 地雞 ('soil/earth chicken'), *zhang tou* 獐頭 ('river deer's head') (*Ben cao gang mu*). It seems to me likely that *tu jun* has a generic meaning and designates the whole

⁷²² Probably the mushrooms called *song hua jun*, a term that the author of the *Wu xun pu* gives as a synonym of *lei jing xun*.

⁷²³ Kitamura Shiro (1985, p. 408).

group of mushrooms that grow on the ground, as opposed to those that grow on trees or on dead wood. In that case, it is pointless to attempt a precise botanical identification, or even an approximation at the genus level. Under the same entry there are, indeed, references to *zhong gui*, *xian ren mao* and *hei jun*. *Wu mu er* 五木耳 (*Guang jun pu*). Generic term designating a group of mushrooms that grow on trees, the list of which varies from one author to another. The term certainly encompasses at least the edible species that belong to the *Auricularia*, *Tremella*, *Pleurotus* and *Armillaria* genera.

Xian ren mao 仙人帽, 'headwear of the immortals' (*Guang jun pu*). This term designates the *zhong kui jun* 鍾馗菌 that are piled up on top of one another. The mushroom is also called 'earth chicken', *di ji* 地雞, or 'hydropote-head mushroom', *zhang tou jun* 獐頭菌.⁷²⁴ The comparison with the head of this animal suggests that this is a mushroom with a hirsute aspect and a little beard under its chin. *Sarcodon imbricatus* (L. ex Fr.) Karst. seems to me to be one possibility, particularly as one contemporary name of this mushroom is *di ji* and another is *zhong kui jun* 鍾馗菌.⁷²⁵

Xiang xun 香蕈, 'perfumed mushroom'. The name given to mushrooms of a purple colour that grow on the wood of *Paulownias*, *tong* 桐; willows, *liu* 柳; *Poncirus*, *zhi* 枳 (*Guang jun pu*). Li Shizhen considers it to be a generic name designating a group of nine edible mushrooms that includes, in particular, *Lentinus edodes* and *Tricholoma matsutake*.

Xiao xun 笑蕈, 'laughter mushroom'. Many of the texts that I have consulted mention mushrooms, often unnamed, said by most of the authors to provoke 'uncontrollable' laughter. For example, Tao Gu 陶穀 (active in the mid-10th century) writes, in the *Qing yi lu* 清異錄, of the 'malady of dry laughter', *gan xiao ji* 乾笑疾, a forced, sardonic laugh⁷²⁶ or 'a dry laugh without mirth',⁷²⁷ and notes that, as a joke, peasants called the mushroom *xiao yi hu* 笑矣乎, 'now you are laughing, are you not?'.⁷²⁸ This is a symptom that has been attested in modern mycological literature since the early 19th century,⁷²⁹ and in China already by Zhang Hua 張華 (+232–300) in the *Bo wu zhi* 博物志. He states that after the felling of great trees, between the spring and the summer there appear mushrooms called *shen* 甚 – the word for the mulberries of a mulberry tree – which, when eaten, cause death. He also states that the mushrooms that grew on liquidambar close to which snakes lived caused laughter that was uncontrollable, *xiao bu de zhi* 笑不得止, unless one partook of a thick earth soup *tu jiang* 土漿.⁷³⁰ Such a state is provoked by the ingestion of paneoles, *Paneolus* sp. This kind of mushroom brings about rapid effects, in particular laughter. A person who had experienced such intoxication reports that

⁷²⁴ *Hydropotes inermis* Swinhoe, cf Shou Zhenhuang (1962, p. 445).

⁷²⁵ Zhang Guangya (1984, p. 106).

⁷²⁶ Anon. (1976, p. 138). ⁷²⁷ Mathews (1963, p. 486).

⁷²⁸ Cited in *Shou Butsu Rui San, Jun shu* 菌屬, *juan* 8, 2a.

⁷²⁹ A historical account of the principal cases described can be found in Heim (1963, pp. 251–9).

⁷³⁰ Zhang Hua (1980, p. 39).

soon, we were seized by an onset of hilarity and felt an immoderate, even hysterical need to laugh and crack jokes. It was only with great difficulty that we could control our laughter. We succumbed to remarks and jokes that seemed to us very funny and witty.⁷³¹

There are at least three kinds of these mushroom in China, *Panaeolus papilionaceus* (Bul. ex Fr. em. Fr.) Quél., *Panaeolus retirugis* (Fr.) Gill. and *Panaeolus campanulatus* (L. ex Fr.) Quél. In a study of their ecology mentioned by a team of mycologists from the laboratory of microbiology of the Chinese Academy of Sciences,⁷³² there is no reference at all to liquidambers. However, it is certainly noted that all these mushrooms provoke in people who consume them, alongside other symptoms, laughter, hysteria, singing and dancing. However, all the evidence reported by Roger Heim also testifies to the fact that eating these mushrooms causes no trouble in the digestive system and that after a few hours all the effects disappear, leaving the subject with no after-effects. This point may help to explain the supposed efficacy of the antidote regularly recommended in all the texts that mention these mushrooms, namely the 'earth soup' that has to be swallowed, whereas in other types of intoxication what is recommended is evacuation by vomiting followed by swallowing an antidote.

Yang du cai, 羊肚菜, 'sheep's tripe vegetable' (*Guang jun pu*). The description of these 'sheep's tripes', classed in the *mo gu xun* group, makes it possible to recognise morels, *Morchella* sp., and in particular the excellent representatives of the *Morchella esculenta* (L.) Pers. species.⁷³³ The modern name *yang tu jun*, 'sheep's tripe mushroom', corroborates this hypothesis.

Yang shu xun 楊樹蕈, 'willow mushroom' (*Wu xun pu*). ???

Ye za ban xun 野雜斑蕈, 'wild mottled mushroom' (*Wu xun pu*). The long stem that is mottled 'like a pheasant' puts me in mind of lepiotes, *Lepiota* sp.,⁷³⁴ or certain amanites, *Amanita* sp.⁷³⁵

Yu xun 玉蕈, 'jade mushroom' (*Jun pu*). The mention of the colour of jade suggests that this term refers to a russula, the palomet or green russula, *Russula virescens* (Schaeff.) Fr.,⁷³⁶ 'with a nutty taste, [which] is one of the most highly esteemed edible mushrooms'.⁷³⁷ I think that this same mushroom is also designated by *qing mian zi xun* 青面子蕈, 'mushroom with a dark green face', in the *Guang jun pu*.

Zao jia xun 皂莢蕈, 'honey locust mushroom' (*Ben cao gang mu*). This may be a species of *Auricularia* which, in Vietnam, is likewise used only for medicinal purposes.⁷³⁸

Zao jiao jun 皂角菌, 'honey locust mushroom' (*Guang jun pu*). See the previous entry.

⁷³¹ Heim (1963, p. 255), citing an article from *Science*, dated 18 September 1914. ⁷³² Anon. (1975, pp. 192–7).

⁷³³ Cf Chen Shouchang (1988, p. 96); Zhang Guangya (1984, p. 35); Liu Bo (1964, p. 208).

⁷³⁴ Anon. Hunan (1977, p. 114). ⁷³⁵ Anon. Hunan (1977, p. 104 and Plate 38).

⁷³⁶ Liu Bo (1964, p. 73). ⁷³⁷ Heim (1969, p. 372). ⁷³⁸ Sallet (1939, p. 28).

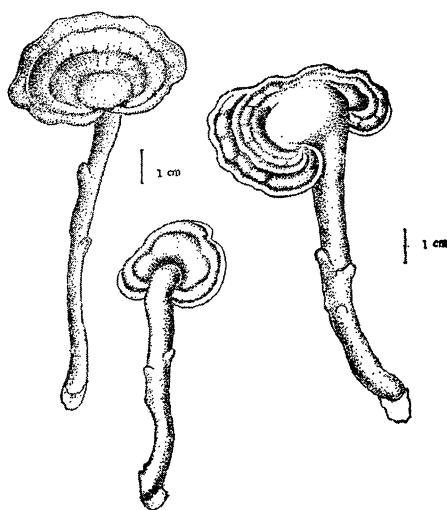


Fig. 156. *Ling zhi* 靈芝 (*Ganoderma lucidum*) (right) and *zi zhi* 紫芝, 'purple zhi' (*Ganoderma japonicum* (Fr.) Lloyd), from Chen Shouchang (1988, p. 56, Fig. 13).

zhi 芝, ganoderma:

qing zhi 青芝, dark green *zhi*, synonym *long zhi* 龍芝, dragon *zhi*;

chi zhi 赤芝, vermilion *zhi*, synonym *dan zhi* 丹芝, cinnabar *zhi*;

huang zhi 丹芝, yellow *zhi*, synonym *jin zhi* 丹芝, golden *zhi*;

bai zhi 白芝, white *zhi*, synonym *yu zhi* 玉芝, jade *zhi*;

hei zhi 黑芝, black *zhi*, synonym *xuan zhi* 玄芝, dark *zhi*;

zi zhi 紫芝, purple *zhi*, synonym *mu zhi* 木芝, wood *zhi* (*Ben cao gang mu*).

These are representatives of the *Ganoderma* genus. In the modern Chinese scientific nomenclature, *chi zhi*, 'vermilion *zhi*', is a synonym of *ling zhi* 靈芝, the name of *Ganoderma lucidum* (Leyss. ex Fr.) Karst.;⁷³⁹ *zi zhi*, 'purple *zhi*', is the name of *Ganoderma japonicum* (Fr.) Lloyd.⁷⁴⁰ (Fig. 156).

Zhong kui 中馗/鍾馗, 'Zhong kui mushrooms' (*Guang jun pu*).⁷⁴¹ Given that the *xian ren mao* 仙人帽, 'headwear of the immortals', are piled up, *zhong kui jun* 鍾馗菌, it seems logical to consider these mushrooms to be a variety of sheep's feet, *Sarcodon* sp.

Zhu ru 竹蓐 = 'bamboo mushrooms', *zhu gu* 竹菰. In the *Ben cao shi yi* (c.739) by Chen Zangqi, it is 'bamboo flesh', *zhu rou* 竹肉 (*Guang jun pu*). = *Zhu rou* 竹肉, *zhu gu* 竹菰, *zhu xun* 竹蕈 (*Ben cao gang mu*). These mushrooms are identified by Read as *Puccinia corticoides* Berk. and Br.⁷⁴² This identification, repeated by

⁷³⁹ Liu Bo (1978, p. 95).

⁷⁴⁰ Liu Bo (1978, p. 93).

⁷⁴¹ A mythical figure, a hunter of devils.

⁷⁴² Read (1936, p. 280, no 841).

Kitamura,⁷⁴³ does not seem convincing to me. I assume, by deductive reasoning, that the *zhu gu* 竹菰, 'bamboo mushrooms', are more likely representatives of the *Dictyophora* genus, named *zhu sun* 竹荪 in modern Chinese. The species *Dictyophora indusiata* (Vent. ex Pers.) Fischer is nowadays named *mo gu nü huang* 蘑菇女皇, 'empress of mushrooms', in the Shaotong region to the north-east of Yunnan.⁷⁴⁴ This mushroom grows in bamboo stands. When it begins to grow it resembles a white ball and there are, indeed, two edible species with a white covering, *Dictyophora indusiata* (Vent. ex Pers.) Fischer and *Dictyophora duplicata* (Bosc.) Fischer,⁷⁴⁵ and another with an orange covering, *Dictyophora multicolor* Berk. and Br.⁷⁴⁶ A passage from the *You yang za zu*,⁷⁴⁷ which, strangely, neither Pan Zhihuan nor Li Shizhen has mentioned, possibly thinking it too fabulous, gives a description that confirms that identification. It runs as follows:

In the tenth year of the Da Dong period [+545], in a forest of bamboos there appeared a mushroom (*zhi* 芝) eight inches high, with a cap that resembled a euryalus fruit (*ji tou shi* 雞頭實),⁷⁴⁸ black in colour, while its foot resembled an *ou* 藕 [a lotus rhizome]. The foot was hollow and its skin was uniformly white and slightly red under the root. The top, in the shape of a euryalus fruit, was like a bamboo node and was easily detached. From this node there grew, as it were, a net that spread on all four sides all around to a height of four or five inches, beginning at the top of the foot. It resembled a very fine net and was very pretty. It was possible to separate the net from the foot.

A glance at a modern representation of *Dictyophora* (Fig. 157) confirms the accuracy of the description.

The fact that Pan Zhihuan and Li Shizhen ignored the description cited above suggests to me that they had never seen what they were describing and that they based their description exclusively on texts. The same main term may no doubt refer to a number of different items. As well as the *Dictyophora* there are *zhu gu* 竹菰, 'bamboo mushrooms', that emerge from the ground 'like the antlers of deer', and there is also *zhu rou*, 'bamboo meat', that grows on branches and may be poisonous. The comparison with antlers or horns leads me to think that these 'bamboo mushrooms' might be species belonging to the *Clavulina* genus (Fig. 158). As for the latter, Duan Chengshi mentions them in a note separate from that referring to the *Dictyophoras* and entitled, precisely, *zhu rou*.⁷⁴⁹ They are probably mushrooms of the following species: *Engleromyces goetzi* P. Henn. (Fig. 159), or else *Hypocrella bambusae* (B. and Br.) Sacc. (Fig. 160), today respectively named *rou qiu jun* 肉球菌, 'meatball mushroom', and *zhu xiao rou zuo jun* 竹小肉坐菌, 'little meat base bamboo mushroom', both of which are used as *materia medica*.⁷⁵⁰ The confusion may arise from the

⁷⁴³ *Stereostromum corticioides* (Berk. et Broom.) Magn. = *Puccinia corticioides* Berk. et Br., in Kitamura Shiro (1985, p. 409).

⁷⁴⁴ Zhang Guangya (1984, p. 15). ⁷⁴⁵ Zhang Guangya (1984, pp. 14–15).

⁷⁴⁶ Anon. Hunan (1977, pp. 136 and Fig. 49). ⁷⁴⁷ Duan Chengshi (1981, p. 187, no 329).

⁷⁴⁸ *Euryale ferox* Salisb., in anon. (1977b, Fig. 2183). ⁷⁴⁹ Duan Chengshi (1981, p. 189, no 357).

⁷⁵⁰ Liu Po (1978, pp. 7–10).

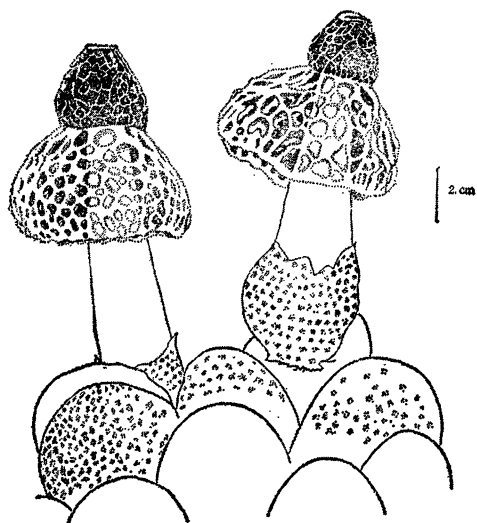


Fig. 157. *Duan qun zhu sun* 短裙竹蓐 (*Dictyophora duplicata* (Bosc.) Fischer), from Chen Shouchang (1988, p. 86, Fig. 30). The illustration shows clearly that the Chinese name refers to a mushroom with a 'short skirt'. The lower section of the illustration shows mushrooms still enclosed in their volva, called at this stage 'bamboo eggs'.

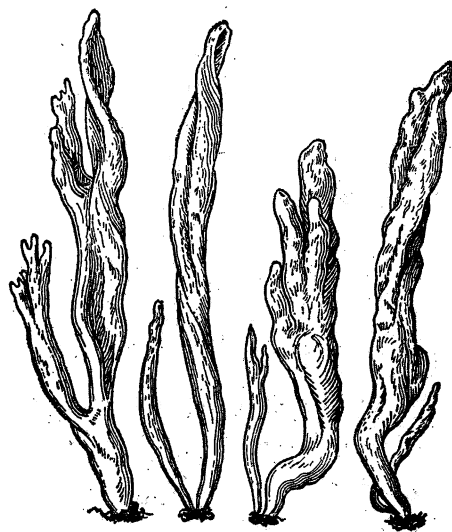


Fig. 158. *Guan suo hu jun* 冠鎖瑚菌 (*Clavulina cristata* (Holmsk ex Fr.) Schrot.), from Zhang Guangya (1984, p. 293, Fig. 85; p. 294, Fig. 86).

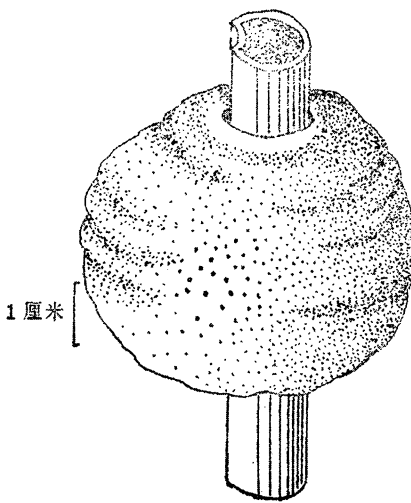


Fig. 159. *Rou qiu jun* 肉球菌 (*Engleromyces goetzi* P. Henn.), from Liu Bo (1978, p. 8, Fig. 3).

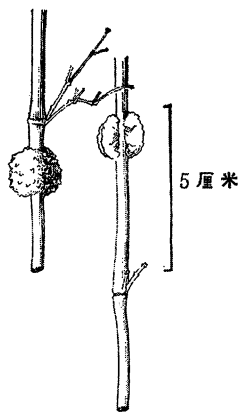


Fig. 160. *Zhu xiao rou zuo jun* 竹小肉坐菌 (*Hypocrella bambusae* (B. et Br.) Sacc.), from Liu Bo (1978, p. 10, Fig. 4a).

fact that before the foot develops, when the mushroom is still enveloped in its volva, the *Dictyophora* have a rounded shape comparable to that of the species of mushroom that develop on bamboo branches. Today they are called *jun dan* 菌蛋, ‘egg mushrooms’, or popularly, among the mountain people of Sichuan, *zhu ji dan* 竹雞蛋, ‘bamboo eggs’⁷⁵¹ (Fig. 157).

⁷⁵¹ Chen Shouchang (1988, p. 86).

Zhu xun 竹蕈 (Jun Pu). Perhaps a synonym of *zhu ru* of the *Guang jun pu*, *Dictyophora* sp.

Zi hua xun 紫花蕈, 'mushroom with violet flowers' (*Wu xun pu*). The yellow of the gills suggests a russula, *Russula puellaris* Fr.⁷⁵²

Zi mian xun 紫面蕈, 'purple-capped mushroom' (*Wu xun pu*). ???

Zi xue xun 紫血蕈, 'violet blood mushroom' (*Wu xun pu*). ???

Zi xun 紫蕈 = (pop.) *zi fu xun* 紫富蕈 (*Jun pu*). Given its textual proximity, the name may refer to russulas. The colour of the cap leads me to suggest *Russula depallens* (Pers.) Fr.⁷⁵³ and *Russula puellaris* Fr.⁷⁵⁴ Bearing in mind a Japanese equivalent given in the *Shoubutsu Rui San*, namely *hatsutake*, another possibility might be a species of *Lactarius*, *Lactarius hatsutake* Tanaka.⁷⁵⁵ However, the mushrooms of this species have a cap the colour of which may vary from pink to orange, so I am more inclined to stick to my first suggestion.

We come to the end of this chapter which, paradoxically, also closes the first part of this volume. Did the Daoist specialists sense in advance the problems that this category of natural objects would pose, when they described *zhi* 芝 of flesh, of stone or of animals? The fact is that from then on mushrooms were, for some people, no longer vegetables but were closer even to animal organisms, forming a kingdom of their own. Perhaps, a posteriori, that constitutes a justification for having treated them separately right at the end of this section devoted to traditional botany.

The theme of the next chapter will be horticulture. There can be no denying that this chapter might well have constituted a volume on its own, given that the subject matter is so rich. However, the intention here is not to produce a history of horticulture but to concentrate on certain horticultural practices. We shall have occasion to see that the kinds of knowledge implied by these practices shed light on a number of aspects of knowledge about plant life that we have already encountered.

⁷⁵² Anon. Hunan (1977, p. 79 and Fig. 24). ⁷⁵³ Anon. Hunan (1977, pp. 77–8).

⁷⁵⁴ Anon. Hunan (1977, p. 79 and coloured Plate 24).

⁷⁵⁵ Imazeki Rokuya, Hongo Tsuguo and Tsubaki Keisuke (1970, p. 122 and coloured Plate 61, no 5). It is worth noting that consumption of this lactary is attested, nowadays, in North Vietnam (Joly, Perreau 1977, p. 160).

(i) HORTICULTURE AND ITS TECHNIQUES

(1) PROLOGUE

This new section of the volume could have constituted the subject of a separate publication, for it clearly belongs to the domain of the history of techniques. Nevertheless, Joseph Needham had intended it to be a chapter in the 'Botany' volume, the first part of which was published in 1986. In fact he was not thinking of producing a history of Chinese horticulture but rather of presenting certain aspects of that history that would make possible a better understanding of ancient Chinese ideas about plant life and people's relations with plants. I have therefore tried to concentrate on those two aspects, in particular by presenting a history of plant grafting and by adopting an ethnobotanical perspective on the subject of gardens. As will be clear, here too I make no claims to have exhausted the subject but have simply prepared the ground to some extent.

In Volume 6, Part 1, which precedes the present one, Joseph Needham and Lu Gwei-djen have already presented various horticultural monographs on citrus fruits, bamboos, peonies, chrysanthemums, orchids, Rosaceae and a number of other ornamental plants such as *barringtonias*, *hydrangeas* and *camellias*.¹ I shall, of course, not be continuing to consider the various treatises already described particularly since the cases of citrus fruits, bamboos and shrub peonies, which have already been treated at length,² give a good idea of the richness of those articles. Alongside the monographs, texts of various other kinds can also tell us about the history of Chinese horticulture. For example, in treatises on agriculture certain chapters are devoted to the cultivation of vegetables and fruits. We also find treatises exclusively composed in order to make it possible to care for a garden possessing a great diversity of ornamental and market-garden plants and fruit trees. Other works are devoted more specifically to ornamental plants with the purpose of encouraging appreciation of their beauty, as well as teaching how to care for them. All these works provide details relating to horticultural practices and in many cases also to the characteristics of various cultivars of the species grown. The collections of notes made by literati are another valuable source that not only helps us to appreciate the sensitivity of their authors in the presence of plants but also, in many cases, provides details concerning the transport of plants, the dates of their introduction into certain regions, and how they could be obtained and the particular techniques used to cultivate or multiply them. Another source, finally, consists of descriptions – or rather evocations – of gardens. In this case, there is hardly ever any mention of the techniques employed for their cultivation or of details about the

¹ See *SCC* Volume 6, Part 1, pp. 355–440.

² See *SCC* Volume 6, Part 1, pp. 363–77, 377–94, and 394–409 respectively.

disposition of plants and buildings, but on the other hand the authors sometimes like to list and name all the plants gathered together in a particular spot, often specifying a distant origin, with the aim of increasing still further the value of these collections. Descriptions of gardens are also to be found in novels such as the *Jin ping mei* 金瓶梅 (The Golden Lotus, author unknown, beginning of 17th century) and the *Hong lou meng* 紅樓夢 (The Dream of the Red Chamber, by Cao Xueqin, 1st edn 1791), and in some of the stories in the *Jin gu qi guan* 今古奇觀 (Strange Spectacles from Today and the Past, edited by Feng Menglong, c.1640–4) by Feng Menglong, to cite but three.³ Reserving the case of gardens for the next chapter, I have chosen at this point to consider mainly technical texts, presenting them in chronological order, along with some notes on the critical appreciation of plants. Although horticulture as a specific technical domain does not appear in the classificatory categories of Chinese bibliographies, most of the texts that I shall now be citing are generally classed in the category of the works of agricultural specialists, *nong jia* 農家. How is it possible to distinguish the texts of horticultural interest in these collections? By following the classification explained by the system of the Five Phases, *Wu xing* 五行, one realises that the plants that are consumed as food are divided between three groups that comprise grains, vegetables and fruits; these are represented, in the system of correspondence said to be of *yin-yang Wu xing* 陰陽五行, *yin-yang* and the Five Phases, by the categories designated by the Five Grains, *wu gu* 五穀; the Five Vegetables, *wu cai* 五菜; and the Five fruits, *wu guo* 五果. The plants belonging to the first group form the very bases of food,⁴ the others complement them. The cultivation of grains takes place in fields, that of vegetables and fruits in places enclosed by walls, as we are reminded by the descriptions of the *Shuo wen jie zi* 說文解字 (*pu* 圃, Fig. 161; *yuan* 園, Fig. 162). A remark made by Wang Shimao 王世懋 in the *Xue pu za shu* 學圃雜疏 (Various Notes on the Study of Gardening) (preface dated 1587) further confirms this: in the chapter devoted to grains, ‘*Dou shu*’ 豆疏,⁵ which concerns the broad bean, *can dou* 蠶豆; the sword bean, *dao dou* 刀豆;⁶ the feather cockscomb, *cao jue ming* 草決明;⁷ and Job’s tears *yi yi* 薏苡,⁸ ‘the soya (*shu* 菽) belongs to the Five Grains, so it is not found in gardens’ – *fei pu zhong wu ye* 非圃中物也. The plants cultivated in gardens will be the subject of this chapter, the grains having already been described by Francesca Bray in an earlier volume.⁹

(2) TREATISES ON HORTICULTURE

As far as we know today, the most ancient text exclusively concerning market-garden plants in China is probably what remains of the *Yin du wei shu* 尹都尉書. Its

³ There are recent French translations of these three works; see Cao Xueqin (1981); Lanselle (1996); Lévy (1985).

⁴ See Chang Kuang Chih (1977a).

⁵ See p. 323 of the first volume of the modern edition (anon. 1993a).

⁶ *Canavalia gladiata* (Jacq.) DC.

⁷ *Celosia argentea* L.

⁸ *Coix lacryma-jobi* L.

⁹ See SCC Volume 6, Part II.

圃
種菜曰圃
从口甫聲
博古切

Fig. 161. Definition of *pu* 圃 (kitchen garden) in *Shuo wen jie zi* (+121): ‘that in which (one) cultivates vegetables’ (*suo yi zhong cai yue pu* 所以種菜曰圃), from Ding Fubao (1928, p. 2730b).

園
所以樹果也
从口袁聲
羽元切

Fig. 162. Definition of *yuan* 園 (orchard) in *Shuo wen jie zi* (+121), ‘that by which one cultivates fruit trees’ (*suo yi shu guo ye* 所以樹果也), from Ding Fubao (1928, p. 2730a).

author, whose patronym was Yin 尹, was probably born between -156 and -140.¹⁰ His name appears with the title *du wei* 都尉, which indicates a function connected with agriculture, in a register dated -113. We know neither his personal name (*ming* 名), nor his surname (*zi* 字). A book in fourteen chapters (*bian* 編) bearing the name *Yin du wei* certainly appears in the bibliography of the history of the Han, *Han shu yi wen zhi* 漢書藝文志, among the agronomists (*nong jia* 農家), but it is not mentioned in the bibliography of the history of the Sui, *Sui shu jing ji zhi* 隋書經籍志. On the basis of citations from this text that appear in literary works and, in particular, in the *Qi min yao shu* 齊民要術,¹¹ Ma Guo-han 馬國翰 was in 1889 able to propose a partial reconstruction in the *Yu han shan fang ji yi shu* 玉函山房輯佚書目 (A Collection of Lost Books). This text, reproduced in the *Yu hai shuo fu* 玉海說郛, consists of six sections, all devoted to the cultivation of plants. These chapters, of varying content and length, contain information about cultivation techniques: the preparation of the soil, manuring, the choice of seeds, associated cultivations, rotation and sowing. Two chapters are particularly detailed, 'Zhong gua' 種瓜 and 'Zhong kui' 種葵. The first describes the cultivation of gourds, the second that of a mallow.¹² The other chapters deal more briefly with the cultivation of mustards, *jie*¹³ 芥; water pepper, *liao*¹⁴ 蓼; the rakkyo,¹⁵ Chinese shallot, *xie* 薤; and finally the Chinese or Welsh spring onion, *cong* 蔥.¹⁶ Already in this early text, we notice the importance attached to the selection of seeds, as we have already had occasion to note earlier regarding the cultivation of hemp and the ginkgo.

Another treatise from the 1st century BC, the *Fan Shengzhi shu* 反生之書,¹⁷ distinguishes clearly between the cultivation of gourds, *gua* 瓜, and the cultivation of calabashes, *hu* 瓠. The fruits of the former are destined for eating, those of the latter, the skin of which dries and hardens when ripe, can be eaten when young but are mainly used as receptacles of various kinds. On the subject of the latter, the

¹⁰ Wang Yuhu (1979, p. 7).

¹¹ For example, in Chapter 1, 'Cultivating gourds', 'Zhong gua', see *juan* 2, section 14; see Shi Shenghan (1957), paras. 14.2.1-14.10.1, pp. 128-30; Mou Qiyu (1982), pp. 110-12.

¹² As I have noted above, this might be *Malva sylvestris* L., which is always present as a wild plant (Li Hui-Lin 1969) or else another species, *Malva crispa* L. (curled mallow), which is still cultivated today along the edges of fields, as an additional crop, in Sichuan, for example; see anon. (1961, pp. 156-8).

¹³ Although today the term *jie cai* 芥菜 designates a mustard, *Brassica juncea* Coss., here it certainly seems that *jie* has a generic sense, hence my choice of 'mustards'. Besides, two cultivars are later cited in the text, *shu jie* 蜀芥 and *yun tai* 芸薹. The former term today designates white mustard, *Brassica alba* L. (Boiss. = *Sinapis alba* L.), the second designates the young leafy stems of bird rape, *Brassica campestris* L. var. *oleifera* DC.

¹⁴ The Chinese term *liao* today has a generic sense, the equivalent of 'renouée' in French or 'knotweed' in English. However, the plant designated by this term in ancient texts has been identified as water pepper, *Polygonum hydropiper* L. See Read (1946, p. 56); Li Hui-Lin (1969, p. 258). Water pepper closely resembles another plant that serves as a vegetable much appreciated by the Vietnamese, *Polygonum odoratum* Lour., Rau Râm. See Uphof (1968); Simon and Simon-Barouh (1972, p. 350); Kuebel and Tucker (1988, p. 414).

¹⁵ *Allium chinense* G. Don (= *A. bakeri* Regel) (Tanaka 1976).¹⁶ *Allium fistulosum* L.

¹⁷ On this text, see Shih Shêng-Han (1959) and *SCC* Volume 6, Part II.

author suggests a process for arithmetically increasing the volume of the fruits, which will be discussed in the chapter devoted to grafting.¹⁸

It is worth noting that nowadays only one of the above vegetables, the water pepper, is no longer consumed. This may be explained by the fact that, as a condiment, it has been replaced advantageously by plants introduced as peppers from South East Asia and India,¹⁹ and by pimentos from the Americas.²⁰ While the cultivation of the mallow seems very localised, the importance of Cucurbitaceae in Chinese food is well known. Various cultivars of mustards are still eaten as much-appreciated leafy vegetables or broccolis. The Chinese shallot, *xie*, domesticated in China,²¹ has been cultivated since antiquity in the south-west region, today the provinces of Guangxi, Hunan, Yunnan, Sichuan and Guizhou. The wild species still exists in Tibet. The bulb, when dried, is used as *materia medica*. When used as a vegetable, the bulbs may be fried or boiled but are usually eaten preserved in vinegar, salt or honey.²² The Chinese onion, *cong*, originally cultivated in eastern Siberia,²³ has been grown in China since ancient times and has remained a very important vegetable in northern regions.

It is probable that the few fragments of the *Yin du wei shu* that I have just quoted were in fact simply passages from an agricultural work similar to the *Fan Shengzhi shu*. If, today, all the plants cited are regarded as kitchen-garden plants, one may well wonder whether it is not the case that the first chapter 'Zhong gua bian' 種瓜編, is not in fact whatever remains from the part of the original work devoted to agriculture in general that preceded that which dealt with market-garden cultivation.²⁴ In that case one of the most ancient horticultural texts might be the *Wei wang hua mu zhi* 魏王花木志 (Memoir on the Trees and Flowers of King Wei). The problem is that this title does not appear in the bibliography of the History of the Sui, although it is referred to in the *Qi min yao shu*. It seems that its author lived under the Qi (+479–502) and the Liang (+502–57).²⁵ In any case, the work has not survived and the text that appears in the *Tu shu ji cheng* 圖書集成 and the *Shuo fu* 說郛²⁶ under the same title is no more than a list of the names of plants and plant

¹⁸ Shih Shêng-Han (1959, p. 18). As will be remembered, these calabashes are classed among the eight musical instruments (see p. 44, note 197, below).

¹⁹ Black pepper, *hu jiao*, *Piper nigrum* L., and long pepper, *Piper longum* L., whose 'Chinese name *pi po* [bi bo 華撥] reminds one of the Sanscrit *pippali*' (Laufer 1919, p. 375).

²⁰ *Capsicum annum* L. and also many cultivars such as sweet peppers and hot chillies.

²¹ See Li Fan (1984), p. 136. ²² See Wu Gengmin (1957), p. 351. ²³ See Wu Gengmin (1957), p. 310.

²⁴ The mention of the first chapter, devoted to gourds, and then of five others in two different rubrics of the *Tai ping yu lan* 太平御覽, as well as the place of gourds in the second *juan* of the *Qi min yao shu* alongside grains, encourage me to consider this possibility as very probable, especially since gourds were assimilated to staple foods at the time when this work was composed.

²⁵ See Wang Yuhu (1979, p. 25).

²⁶ Respectively *Tu shu ji cheng*, *Cao mu dian*, Chapter 5, 24b, and *Shuo fu* (Yuan Wei Shan Tang), Chapter 104.

products accompanied by a text very similar to the *Nanfang cao mu zhuang* 南房草木狀;²⁷ it is certainly not a horticultural treatise.

The most ancient and most complete collection that survives today and is devoted on the one hand to the cultivation of vegetables and on the other to fruit trees is that made up of the third and fourth *juan* of the *Qi min yao shu* 齊民要術 for the classic products of northern China, and the tenth *juan* for products that Jia Sixie considers to be 'non-Chinese'. For an account of this text dated c.535 and for the bibliography relating to it, I refer the reader to the contribution by Francesca Bray in the present series.²⁸ The list of the names of kitchen-garden plants, the cultivation techniques for which are recorded, has already been cited above.²⁹ We should remember that Jia Sixie arranges the whole group of vegetables under thirteen rubrics, namely *kui* 葵, mallow;³⁰ *man jing* 蔓菁, turnip³¹ (with which are associated *song* 松, pakchoi,³² and *lu fu* 蘆菔, radish);³³ *suan* 蒜, garlic (along with *ze suan* 澤蒜, water garlic³⁴); *xie* 薤, Chinese shallot;³⁵ *cong* 蔥, Chinese onion;³⁶ *jiu* 韭, Chinese chive;³⁷ *shu jie* 蜀芥/*yun tai* 芸薹/*jie zi* 芥子, 'mustards';³⁸ *hu sui* 胡荽, coriander;³⁹ *lan xiang* 蘭香, basil;⁴⁰ *ren* 苤/*liao* 蓼, *Perilla*/water pepper;⁴¹ *jiang* 薑, ginger;⁴² *rang he* 藺荷/*qian* 芡/*ju* 芭, mioga ginger⁴³/euryale⁴⁴/lettuce⁴⁵ (with *jin* 莖/*hu xi* 胡蔥, violet/cockleburd);⁴⁶ and *mu xu* 苜蓿, alfalfa.⁴⁷

²⁷ On this text, see *SCC* Volume 6, Part I; and also the translation by Li Hui-Lin (1979) and the account of an international colloquium held in Canton (Guangzhou) (Bai Hongxin 1990). See also Dong Ai (1991).

²⁸ *SCC* Volume 6, Part II. The study by Mou Qiyu (1988) should be added to this bibliography.

²⁹ See the chapter on classification. ³⁰ *Malva verticillata* L., in Li Hui-Lin (1969).

³¹ *Brassica rapa* L.; cf Li Hui-Lin (1969). ³² *Brassica chinensis* L., in Li Hui-Lin (1969).

³³ *Raphanus sativus* L., in Li Hui-Lin (1969).

³⁴ Probably *Allium nipponicum* Franch. et Sav., in Li Hui-Lin (1969).

³⁵ *Allium bakeri* Regel, in Li Hui-Lin (1969) = *A. chinense* G. Don.

³⁶ *Allium fistulosum* L., in Wu Gengmin (1957); Li Hui-Lin (1969).

³⁷ In Wu Gengmin (1957), who gives the latin binomial *Allium odorum* L. Li Hui-Lin (1969) calls it Chinese leek, *Allium ramosum* L. The modern identification should be *Allium tuberosum* Rottler ex Spreng.

³⁸ Li Hui-Lin (1969) gives the following identifications for these three plants: *Brassica alba* Rabenth., white mustard; *Brassica chinensis* var. *oleifera*; *Brassica cernua* Hemsl.

³⁹ *Coriandrum sativum* L., in Li Hui-Lin (1969). ⁴⁰ *Ocimum basilicum* L., in Li Hui-Lin (1969).

⁴¹ *Perilla frutescens* Britt. and *Polygonum hydropiper* L., in Li Hui-Lin (1969). Water pepper is still consumed as a leafy vegetable in South East Asia and is today to be found, fresh, in shops selling Asiatic products in Paris. In Japan, cotyledons are used as an accompaniment to raw fish (*sashimi*) (Hoshikawa and Chihara (1970)), although evocations of the adult plant have a rather disagreeable connotation. The 'nettles'/'orties' of the English and French translations of the title of the novel by Junichiro Tanizaki, *The Taste of Nettles*, are, in truth, *tadé*; that is to say, water pepper. See Métaillé (1999c, p. 284).

⁴² *Zingiber officinale* Rosc., in Li Hui-Lin (1969).

⁴³ *Zingiber mioga* Rosc., in Li Hui-Lin (1969). The young shoots and the rhizome of this ginger, which is native to China and Japan, are still today eaten in the form of pickles in Japan.

⁴⁴ *Euryale ferox* Salisb., confused with *Oenanthe stolonifera* DC. In Li Hui-Lin (1969).

⁴⁵ Li Hui-Lin (1969) identifies the name with *Lactuca denticulata* Maxim. Mou Qiyu (1982, p. 160), on the basis of various explanations, concludes that *ju* can only designate a plant of the *Lactuca* or *Sonchus* genera.

⁴⁶ *Jin* is identified by Li Hui-Lin (1969) as *Viola verecunda* A. Gray, while Mou Qiyu (1982, p. 161) considers that *Viola yedensis* Makino is also a possible choice. Both agree on the identification of *hu xi* as *Xanthium strumarium* L.

⁴⁷ *Medicago sativum* L., in Li Hui-Lin (1969). On the introduction of alfalfa into China, see Laufer (1919), pp. 208–19.

We notice that it is the aromatic and condimentary plants that form the essential body of this collection, which also includes leafy vegetables such as mallows, cabbages and mustards, as well as root vegetables such as radishes. The composition of a classic contemporary breakfast in northern China, in which a few vegetables preserved in pickling brine (cabbages, turnips) are accompanied by preserved garlic seeds and pickles of other kinds flavouring a broth of cereals (rice or millet), may serve to illustrate this complementarity between vegetables and grains.⁴⁸

Each of these chapters specifies the nature of the soil that is suitable for cultivation and the ways of improving it if it is not initially suitable. Next comes the timing of sowing. The author again specifies the best dates for sowing and the drawbacks if sowing takes place at the wrong time. Finally, he gives details concerning harvesting, dates and methods.

The fourth *juan*, which is devoted to fruit cultivation, begins with two general sections, the first describing the way to establish live hedges, the second explaining the major principles of cultivating fruit. Where hedges are concerned, the basic plants to use are the thorny jujubes⁴⁹ and the *Poncirus*,⁵⁰ two shrubs that are well armed with robust thorns, or else willows and elms. In all cases it was a matter of hedges, the branches of which could be plaited together to form a network.

The second chapter is basically devoted to the transplantation of trees. It is noticeable that great importance is attached to the initial orientation, which it is imperative to respect at the time of planting, for otherwise the tree will not flourish. Favourable periods are distinguished by observing the degree of development of the leaves of the various species. Finally, in the event of frosts that would prevent any fruit from forming if the trees are in flower, the advice given is to prepare heaps of grass, dead leaves and animal detritus which, after being set to burn, will provide a slow-burning fire, giving off smoke that will protect the fruit trees. A practice that is often cited for trees is that of 'finding a husband', *jia* 嫁; this term covers a number of different procedures, all of which aim to encourage a good harvest. For jujube trees this takes place at sunrise on New Year's Day. The trunks of the trees are hit with the back of an axe; this initial treatment is completed at the time of the appearance of silkworms, when the branches are beaten with a stick in order to dislodge the 'mad flowers', *kuang hua* 狂花, that will not produce fruits. In the case of plum trees, *li* 李, the 'marriage' consists simply in placing bits of brick and stones in the hollow forks of the branches.⁵¹ It is worth noting that this text provides a representative picture not only of the horticultural techniques practised in northern China but also of the variety of plants cultivated.

A reference to another work, now lost, appeared in the two Tang historical monographs devoted to agronomists. The work was the *Zhong zhi fa* 種植法 (Method of Cultivating Plants), in seventy-seven *juan* that Duan Chengshi cites in his collection

⁴⁸ For a view on certain aspects of food in this period, see Sabban (1988, 1993).

⁴⁹ *Suan zao* 酸棗, *Ziziphus spinosus* Hu. ⁵⁰ *Zhi* 枳, *Poncirus trifoliata* L.

⁵¹ For a historical view of these methods, see Zhou Zhaoji (2000).

of notes, *You yang za zu*. The presumed author, Zhu Geying 朱葛穎, who, to judge by the titles mentioned in the Tang monographs, seems to have produced a large number of literary works under the Sui, must have treated the subject in a less technical manner than did Jia Sixie in his *Qi min yao shu*. That is the reason suggested by Wang Yuhu to explain why the work disappeared after the 9th century.⁵²

The bibliography of the new History of the Tang mentions among the works by agronomists the *Yuan ting hua mu shu* 園庭花木疏 (Memoir on the Trees and Flowers of Gardens), in twenty-one *juan*, by Wang Lin 王綸, *zi* Fangqing 方慶 (d. +703). However, as none of the official or private bibliographies of the Song mention this work, it was probably already lost by the 10th century. Nevertheless, the *Shuo fu* does mention a *Yuan ting cao mu shu* 園庭草木疏 by Wang Fangqin 王方慶.⁵³ Wang Yuhu suggests that this was probably part of the earlier work, given that only eight plants are considered in this text.⁵⁴ The various rubrics simply describe a number of morphological features of the each of the plants cited but make no mention of any horticultural techniques.

The *Bai hua pu* 百花譜 (Treatise on Flowers) (c.+790) is known only from a citation of its author, Jia Dan 賈耽, in the compilation of 250 notes by literati that Ceng Cao 曾慥 edited under the title *Lei shuo* 類說 (+1136). Although the author was contemporary with the Tang, the title of this book does not appear in the bibliographies of the two Tang histories, nor in later bibliographies, and the citation that calls apple trees *hai tang* 海棠, 'immortals among flowers',⁵⁵ is repeated in the Ming period by Wang Lu 王路, the author of the *Hua shi zuo bian* 花史左編, in the first *juan*, entitled 'Hua zhi pin' 花之品 (Appreciation of Flowers), expressing some doubt about the paternity of the book. Despite that doubt, Wang Yuhu considers it plausible to consider Jia Dan to be the author of the *Bai hua pu* as he had composed another book of agronomic interest, also lost, the *Yi niu jing* 醫牛經 (Canon of the Medicine for Bovines).⁵⁶

A vanished text entitled *Si shi zai jie hua guo tu* 四時栽接花果圖 (Images of Fruits and Flowers Cultivated in the Four Seasons), by an unknown author, must still have existed under the Ming and, according to its title, must have been above all an illustrated work, as Wang Yuhu suggests.⁵⁷

The next treatise, *Si shi zuan yao* 四時纂要 (Important Rules for the Four Seasons) by Han E 韓鄂, probably dates from the early 10th century. The only known ancient copy of this book is a Korean edition dated 1590, discovered in Japan in 1960. The scientific editor of the excellent modern edition, Mou Qiyu,⁵⁸ noted a number of problems relating to the Korean edition that are announced by Wang Yuhu,⁵⁹ and in his preface also tries to identify the author, about whose life nothing

⁵² See Wang Yuhu (1979, pp. 31–2).

⁵⁴ Wang Yuhu (1979, pp. 38–9).

⁵⁶ See Wang Yuhu (1979, pp. 42–3).

⁵⁹ Wang Yuhu (1979, pp. 48–50).

⁵³ *Shuo fu* (Yuan Wei Shan Tang), Chapter 104.

⁵⁵ *Yi hai tang wei hua zhong shen xian* 以海棠為花中神仙.

⁵⁷ See Wang Yuhu (1979, p. 63).

⁵⁸ Mou Qiyu (1981b).

is known; he probably lived toward the end of the Tang period or at the beginning of the Five Dynasties period.⁶⁰ As the title suggests, this treatise took the form of an agricultural calendar in which the appropriate activities for each month were indicated. It concerned plants, animals and the transformations of agricultural products. So this was not, strictly speaking, a horticultural work; nevertheless, many passages do concern trees and fruit trees and also vegetables. I shall soon have an opportunity to present a detailed account of information relating to the techniques of grafting.

Various parts of an anonymous manuscript of fifty-seven leaves – that is to say, 104 pages – preserved in the Shanghai Library, the *Fen men suo sui lu* 分門鎖碎錄 (Meticulous Notes Classed in Domains), concern horticulture in the widest sense: ‘bamboos’, *zhu*; ‘trees’, *mu*; ‘flowers’, *hua*; ‘fruits’, *guo*; ‘vegetables’, *cai*. Actually, this work is simply the part relating to the agricultural domain of an encyclopaedic work bearing the same title.⁶¹ According to the notes of Chen Zhensun 陳振孫 in the *Zhi zhai shu lu jie ti* 直齋書錄解題, the first author of this text, the title of which is sometimes abridged to *Suo sui lu*, is Wen Ge 溫革, *zi* Shupi 叔皮, a native of Huian 惠安, to the north-east of the town of the same name in the present-day province of Fujian; he was designated *jin shi* in the Zheng He 政和 period in 1115 under the dynasty of the Northern Song, and he occupied various official positions in the early years of the Southern Song. The text is thought to have been completed by a certain Chen Yezeng 陳晔增.⁶² One of the great interests of this document, according to Hu Daojing,⁶³ who discovered and edited it, is that it reflects practices peculiar to a region corresponding to the south-west and south-east of the present municipality of Shanghai. Each of its various parts describes precise cultivation techniques, beginning with the preparation of the soil. On the subject of trees, after a few general remarks on particular species, the text explains how to multiply them by transplantation, sowing or cuttings, and one separate section is devoted to grafting.⁶⁴ The ‘various techniques’ used for trees are essentially ways of preventing attacks from insects. For flowers, a similar presentation is adopted, with an extra rubric on watering and another on things to be avoided. It is worth noting that among the recommendations we find technical remarks that are still of interest today right alongside others that are linked with ideas peculiar to the time when the texts were published. For example, it states, in connection with sowing cockscombs (*ji guan* 雞冠), that if one stands upright while sowing, this will give shoots with a greater height as well as fine flowers, whereas if one adopts a crouching position, the result will be quite the reverse. Similarly, if one sows using a fan or a woman’s apron the flowers will be large and shaped like the

⁶⁰ See Mou Qiyu (1981b, 1–12). ⁶¹ See Hu Daojing (1985b, pp. 1–2).

⁶² See Wang Yuhu (1979, p. 87); Hu Daojing (1985b, p. 7); Anon. (no date), Postface to the manuscript *Fen men suo sui lu*; Fang Binguan et al. (1933, p. 1292).

⁶³ Hu Daojing (1985b, p. 9). ⁶⁴ See (i), 5, below.

objects used for dispersing the seeds, whereas the flowers produced from seeds sown by hand will be shaped like fingers. It is also recommended that, when planting trees, one should look straight ahead, since to look backwards will lead to a poor harvest.

One of the many interests of this text lies in its regional character, for it provides a glimpse of the plants that were cultivated in the 12th century close to the mouth of the Yangzi river. They are listed here according to the categorisation used in the text. First come the basic grains, called *wu gu* 五穀 or *ba gu* 八穀 (Five Grains or Eight Grains), the mulberry tree (*sang* 桑) and the cudrania (*zhe* 柘), and the bamboos (*zhu* 竹); then come the trees (*mu* 木), the flowers (*hua* 花), the fruits (*guo* 果), the vegetables (*cai* 菜), the mixed plantations (*za zhi* 雜植) and finally the 'varia' (*za shuo* 雜說).

Trees: *yang* 楊 [willow/poplar], *dong qing* 冬青 [holly],⁶⁵ *guang lang* 桃榔 [sugar palm],⁶⁶ *zao jia* 皂莢 [Chinese honey locust],⁶⁷ *shan* 杉 [Chinese fir],⁶⁸ *pin po shu* 貧婆樹 ['tree of the poor old woman'],⁶⁹ *sang* 桑 [mulberry tree], *bai* 柏 [Chinese arborvitae],⁷⁰ *song* 松 [pine], *qing tong* 青桐 [Chinese parasol tree],⁷¹ *liu* 柳 [willow], *shui liu* 水柳 [weeping willow],⁷² *huai* 槐 [Chinese scholar tree].⁷³
 'Flowers': *mu dan* 牡丹 [tree peony], *rui xiang* 瑞香 [daphne],⁷⁴ *suo luo hua* 娑羅花 [mistakenly written *po luo hua* 婆羅花] [sal tree],⁷⁵ *ying shan hong* 映山紅 [ardisia],⁷⁶ *he lian* 荷蓮 [Indian lotus],⁷⁷ *shui xian hua* 水仙花 [narcissus],⁷⁸ *ji guan* 雞冠 [cockscomb],⁷⁹ *ying su* 櫻粟,⁸⁰ *hua rui* 花榮 ['heart of the flower'],⁸¹ *mu xi* 木樨 [osmanthus],⁸² *shi liu* 石榴 [pomegranate],⁸³ *mei* 梅 [Japanese apricot],⁸⁴ *hai tang* 海棠 [crab apple],⁸⁵ *yue gui hua* 月桂花 [sweet bay],⁸⁶ *shao yao* 芍藥 [peony],⁸⁷ *hui lan* 蕙蘭 [orchid],⁸⁸ *fu rong* 芙蓉 [hibiscus],⁸⁹ *ju hua* 菊花 [chrysanthemum], *jue ming* 決明 [senna].⁹⁰

⁶⁵ *Ilex chinensis* Sims; anon. (1977b, Fig. 1533).

⁶⁶ *Arenga pinnata* (Wurm.) Merr.; anon. (1977b, Fig. 3644).

⁶⁷ *Gleditsia sinensis* Lam.; anon. (1977b, Fig. 2326).

⁶⁸ *Cunninghamia lanceolata* (Lamb.) Hook.; anon. (1977b, Fig. 2101).

⁶⁹ Not identified.

⁷⁰ *Biota orientalis* (L.) Endl.; anon. (1977b, Fig. 2840).

⁷¹ *Firmiana simplex* (L.) W. F. Wight; anon. (1977b, Fig. 4071).

⁷² *Salix babylonica* L.; anon. (1977b, Fig. 3175).

⁷³ *Sophora japonica* L.; anon. (1977b, Fig. 5078). ⁷⁴ *Daphne odora* Thunb.; anon. (1977b, Fig. 5063).

⁷⁵ It was a short text by Song Qi 宋祁 (998–1061), cited in the *Tu shu ji cheng* (Cao mu dian, juan 309, p. 52a, 28 555), which corroborates the description given in the text, that persuaded me that the first character was a mistake and that this term certainly designated the flower of the *suo lo shu* 娑羅樹, sal tree, *Shorea robusta* Roxb.; Jia Zuzhang and Jia Zushan (1955, Fig. 0698).

⁷⁶ *Ardisia japonica* (Horns.) Bl.; anon. (1977b, Fig. 4880).

⁷⁷ *Nelumbo nucifera* Gaertn.

⁷⁸ *Narcissus tazetta* L. var. *chinensis* Roem.; anon. (1977b, Fig. 1068).

⁷⁹ *Celosia cristata* L.; anon. (1977b, Fig. 2450).

⁸⁰ Possibly for *ying su* 罌粟, *Papaver somniferum* L., the opium poppy.

⁸¹ Not identified.

⁸² *Osmanthus fragrans* Lour.; anon. (1977b, Fig. 3633).

⁸³ *Punica granatum* L.; anon. (1977b, Fig. 1265).

⁸⁴ *Prunus mume* (Sieb.) Sieb. et Zucc.; anon. (1977b, Fig. 0935).

⁸⁵ *Malus spectabilis* (Ait.) Borkh., Yu Dejun (1982, p. 102).

⁸⁶ *Laurus nobilis* L.; anon. (1977b, Fig. 0974).

⁸⁷ *Paeonia lactiflora* Pall.; anon. (1977b, Fig. 1412).

⁸⁸ *Cymbidium* sp.

⁸⁹ *Hibiscus mutabilis* L., Xu Bingsheng (1959, p. 45).

⁹⁰ *Cassia tora* L.; anon. (1977b, Fig. 1906).

'Fruits': *mei* 梅 [Japanese apricot], *tao* 桃 [peach],⁹¹ *gan ju cheng* 柑橘橙 [mandarin, tangerine, sweet orange],⁹² *shi liu* 石榴 [pomegranate], *yang mei* 楊梅 [bay berry],⁹³ *yin xing* 銀杏 [ginkgo],⁹⁴ *xing* 杏 [apricot],⁹⁵ *gan zhe* 甘蔗 [sugar cane],⁹⁶ *pu tao* 蒲萄 [grape vine],⁹⁷ *zao shu* 棗樹 [jujube tree],⁹⁸ *shi zi* 柿子 [persimmon],⁹⁹ *gan lan* 橄欖 [Chinese olive],¹⁰⁰ *li zhi* 荔枝 [litchi],¹⁰¹ *li* 栗 [sweet chestnut],¹⁰² *tian gua* 甜瓜 [melon],¹⁰³ *mu gua* 木瓜 [Japanese quince],¹⁰⁴ *long yan* 龍眼 [longan].¹⁰⁵

'Vegetables': *xing cai* 苣菜,¹⁰⁶ *chun* 蓴,¹⁰⁷ *gou qi* 枸杞 [Chinese wolfberry],¹⁰⁸ *hu* 瓠 [lagenaria gourd],¹⁰⁹ *gua* 瓜 [gourds], *si gua* 絲瓜 [loofah gourd, vegetable sponge],¹¹⁰ *yu* 芋 [taro],¹¹¹ *qie zi* 茄子 [eggplant],¹¹² *po leng* 菠薐 [spinach],¹¹³ *dong gua* 冬瓜,¹¹⁴ *jiang* 薑 [ginger],¹¹⁵ *luo fu* 蘿蔔 [turnip],¹¹⁶ *suan* 蒜 [garlic].¹¹⁷

'Mixed plantations': *shui ba jiao* 水芭蕉 [banana], *hong ba jiao* 紅芭蕉 [banana],¹¹⁸ *mai men dong* 麥門冬,¹¹⁹ *di huang* 地黃,¹²⁰ *shan yao* 山藥 yam,¹²¹ *jing jie* 荊芥,¹²²

⁹¹ *Prunus persica* (L.) Batsch.; anon. (1977b, Fig. 3664).

⁹² These identifications make no claim to exactness, given the difficulties posed by the classification of species and varieties of *Citrus*, difficulties that are further increased given the historical perspective. To distinguish the fruits designated by these three names that often recur in the texts, I have made the following choices: king orange, *gan* 柑, *Citrus reticulata* Blanco (= *C. nobilis* Lour.); tangerine, *ju* 橘, *C. dangerina* Hort. ex Tanaka; sweet orange, *cheng* 橙, *Citrus sinensis* Osbeck (Yu Dejun 1982, p. 291). Indeed, Li Shizhen's *Ben cao gang mu* (1975–81, Volume 3, p. 1786) states, 'ju and gan are in the same category but are different. The fruits of the ju are small with acidulated flesh, their skin is thin and vermilion with a taste that is sharp and bitter. The fruits of the gan are larger than those of the ju, their flesh is sweet, their skin is slightly thicker and yellow, with a taste that is sharp but sweet'. The uncertain botanical identifications that are proposed are based on extrapolations from Yu Dejun (1982, pp. 291–2; 296) and Kong Xu (1987, pp. 872–3) and also Fèvre and Métaillé (2005).

⁹³ *Myrica rubra* Sieb. et Zucc.; anon. (1977b, no 2112, p. 1040). ⁹⁴ *Ginkgo biloba* L.; anon. (1977b, Fig. 1384).

⁹⁵ *Prunus armeniaca* L. = *Armeniaca vulgaris* Lam.; anon. (1977b, Fig. 2240).

⁹⁶ *Saccharum sinensis* Roxb.; anon. (1977b, Fig. 1190). ⁹⁷ *Vitis vinifera* L.; anon. (1977b, Fig. 4809).

⁹⁸ *Ziziphus jujuba* Mill. var. *inermis* (Bge.) Rehd.; anon. (1977b, Fig. 0187).

⁹⁹ *Diospyros kaki* L. f.; anon. (1977b, Fig. 3187). ¹⁰⁰ *Canarium album* (Lour.) Raeusch; anon. (1977b, Fig. 5447).

¹⁰¹ *Litchi sinensis* Sonn.; anon. (1977b, Fig. 3342). ¹⁰² *Castanea mollissima* Bl.; anon. (1977b, Fig. 3731).

¹⁰³ *Cucumis melo* L.; anon. (1977b, Fig. 4483).

¹⁰⁴ *Chaenomeles lagenaria* (Loisel.) Koidz.; anon. (1977b, Fig. 0700).

¹⁰⁵ *Euphorbia longan* (Lour.) Steud.; anon. (1977b, Fig. 1300).

¹⁰⁶ *Nymphoides peltatum* (Gmel.) O. Ktze.; anon. (1977b, no 3685, p. 1797).

¹⁰⁷ *Brasenia schreberi* J. F. Gmel.; anon. (1977b, Fig. 3721).

¹⁰⁸ *Lycium chinense* Mill.; anon. (1977b, Fig. 3163). The fruit is medicinal; it is the leafy twigs that are eaten as vegetables. See anon. (1974a, pp. 154–5).

¹⁰⁹ *Lagenaria siceraria* (Molina) Standl. (anon. 1977 a, no 2653, p. 1296).

¹¹⁰ *Luffa cylindrica* (L.) Roem.; anon. (1977b, Fig. 1588).

¹¹¹ *Colocasia esculenta* (L.) Schott; anon. (1977b, Fig. 1672). ¹¹² *Solanum melongena* L.; anon. (1977b, Fig. 2689).

¹¹³ *Spinacia oleracea* L.; anon. (1977b, Fig. 4138). ¹¹⁴ *Benincasa hispida* (Thunb.) Cogn.; anon. (1977b, Fig. 4138).

¹¹⁵ *Zingiber officinale* Rosc.; anon. (1977b, Fig. 1358). ¹¹⁶ *Raphanus sativus* L.; anon. (1977b, Fig. 3688).

¹¹⁷ *Allium sativum* L.; anon. (1977b, Fig. 0190).

¹¹⁸ Two varieties that are not identified precisely; possibly *Musa nana* Loureiro, a species indigenous in China; see Yu Dejun (1982, p. 355).

¹¹⁹ *Ophiopogon japonicus* Ker-Gawl.; anon. (1977b, Fig. 2081).

¹²⁰ *Rehmannia glutinosa* (Gaertn.) Libosch.; anon. (1977b, Fig. 0133).

¹²¹ *Dioscorea opposita* Thunb.; anon. (1977b, Fig. 0319).

¹²² *Schizonepeta tenuifolia* (Benth.) Briq.; anon. (1977b, Fig. 3246).

chang pu 菖蒲,¹²³ *shi chang pu* 石菖蒲,¹²⁴ *bai he* 百合,¹²⁵ *bai bu* 百部,¹²⁶ *mu gua* 木瓜 [Japanese quince],¹²⁷ *zhu yu* 茱萸,¹²⁸ *zhi* 枳,¹²⁹ *jun zi* 菌子 [mushrooms].
 ‘Varia’: *xiang cai* 香菜,¹³⁰ *tu long nao* 土龍腦,¹³¹ *jiao shou* 茭苢.¹³²

Such was the diversity of the actual plants cultivated or possibly of the ones that the author wished to see developed. I find it interesting that the mallow, which appears as the first listed vegetable in quite a few texts, even later ones, is not mentioned here; similarly, the various gourds cited appear in the category of ‘vegetables’ and so do not have the status of a staple food as we noticed they did in the *Qi min yao shu*. We should also note the presence of litchis and longans, which nowadays are mostly cultivated in more southern regions.

It is also thanks to the research of Hu Daojing that the *Zhong yi bi yong* 種藝必用 (Everyman’s Guide to Agriculture) by Wu Yi 吳懌 – or Wu Cuan 吳攢 – was discovered in the early 1960s. It is absent from all the historical bibliographies but is mentioned on pages 12–20 of *juan* 13194 of the *Yong Le da dian* 永樂大典, followed (on pages 20–4) by a supplement by Zhang Fu 張福, *Zhong yi bi yong bu yi* 種藝必用補遺 (Addenda to Everyman’s Guide to Agriculture). Hu Daojing, on the basis of their style, considers that the originality of these two documents, in comparison with other works on agriculture, lies in the fact that they were intended not for officials but for peasants. Further proof of their diffusion among peasants is the persistence of their contents – despite the apparent disappearance of the two texts – for to a large extent they reappear in other works with a wide circulation, such as the *Zhong shu shu* 種樹書. However, as we shall see when we come to study grafting techniques, not all the information provided in the *Zhong yi bi yong* is original. In particular, this synthesis owes much to the *Si shi zuan yao* 四時纂要 by Han E 韓鄂, who himself owed much to the *Qi min yao shu* as well as to the *Fen men suo lu* and to original contributions by the author,¹³³ the sources of which may be original and unpublished collections of popular knowledge. This text is very rich in information about techniques for cultivating vegetables introduced from elsewhere (spinach, lettuces, asparagus, loofah, and so on) and also semi-tropical fruits (litchis, *Canarium* etc.). It also contains details about the characteristics and the cultivation of bamboos, about grafting techniques,¹³⁴ and about the cultivation of fruit trees, and a number of notes relating to the cultivation of ornamental plants. Although

¹²³ ? *Acorus calamus* L.; anon. (1977b, Fig. 1390). ¹²⁴ *Acorus gramineus* Soland.; anon. (1977b, Fig. 1254).

¹²⁵ *Lilium brownii* F. E. Brown var. *colchesteri* Wils.; anon. (1977b, Fig. 1728).

¹²⁶ *Stemona japonica* (Bl.) Miq.; anon. (1977b, Fig. 1729).

¹²⁷ Already cited among the fruits; possibly placed here for its flowers.

¹²⁸ This is probably *wu zhu yu* 吳茱萸, *Evodia rutaecarpa* (Juss.) Benth.; anon. (1977b, Fig. 2280).

¹²⁹ *Poncirus trifoliata* (L.) Raf.; anon. (1977b, Fig. 3162).

¹³⁰ This ‘fragrant vegetable’ is probably a basil (*lan xiang*); the two names are given as synonyms in the *Jia pu ji* 稼圃輯 (see pp. 420–1 below), which lists the plants cultivated in the same region.

¹³¹ Not identified. ¹³² *Zizania caduciflora* (Turcz.) Hand.-Mazz.; anon. (1977b, Fig. 3333).

¹³³ Hu (1985b, p. 56). ¹³⁴ See below, pp. 485, 515–16.

these two texts take the form of brush-stroke jottings, making¹³⁵ no distinction by using paragraphs, in the edition that Hu Daojing produced he divides the contents into 170 and 72 rubrics respectively. Many indications that emerge from a textual analysis lead him to conclude that the authors are describing a situation in southern China. As for the dating of the documents, he places the completion of the *Zhong yi bi yong* to just before or just after the end of the Song period (1279), or perhaps to the Yuan dynasty, and dates the supplement to the very beginning of the Yuan.¹³⁵

The *Zhong shu shu* 種樹書 (Book on the Cultivation of Woods) poses numerous problems regarding both the identification of its author and the authenticity of the text.¹³⁶ Many different versions of it exist, for, under the Ming and the Qing, this book was incorporated into numerous encyclopaedic collections. In the *Yi men guang du* 夷門廣牘 by Zhou Lüjing 周履晴, published during the Wan Li period (1573–1620), the text is presented in three *juan*. The first concerns activities linked with the agricultural calendar; the second is devoted to grains (*gu mai* 穀麥), the mulberry tree (*sang*), bamboos (*zhu*) and trees (*mu*); the third describes flowers (*hua*), fruit trees (*guo*) and vegetables (*cai*). Other editions contain no divisions into *juan* and their contents are somewhat different. Some editors, such as Zhang Zongxiang 張宗祥, in the *Shuo fu san zhong* 說郭三種, divide the text into seven sections (*jie* 節) devoted, successively, to trees (*mu*), the mulberry tree (*sang*), bamboos (*zhu*), fruit trees (*guo*), grains (*gu mai*), vegetables (*cai*) and flowers (*hua*). Others divide it into two parts; the first contains activities linked with the agricultural calendar, while in the second, seven sections are devoted successively to ‘recipes for cultivating trees’, *zhong shu fang* 種樹方, the mulberry tree, bamboos, trees, flowers, fruit trees and vegetables. As for the identity of the author, some suggest a man of the Tang period, Guo Tuotuo 郭橐駝, solely on the basis of a text by Liu Zongyuan 柳宗元 (773–819), *Zhong shu guo tuotuo zhuan* 種樹郭橐駝傳, which refers to an excellent gardener, Guo Tuotuo, whose talent was much appreciated in Changan.¹³⁷ However, the literature contains no allusion to any book composed by this man. Others, such as Wang Yuhu,¹³⁸ incline toward an author of the Yuan period or the early Ming period, namely Yu Zongben 俞宗本. Finally, yet others, such as Hu Daojing,¹³⁹ suggest Yu Zhenmu 俞貞木, an author of the Ming period.¹⁴⁰ Although this treatise has in the past acquired great renown on account of its originality, that appreciation should perhaps be qualified since this collection owes much to its predecessors and, as Hu Daojing points out, in particular to the *Zhong yi bi yong* and its supplement. He calculates that 65.9 per cent of the text of *juan* 2 and 3 of the *Zhong shu shu* – that is to say 124 rubrics out of 188 – are taken directly from those two earlier works.¹⁴¹

¹³⁵ See Introduction in Hu Daojing (1962, p. 12).

¹³⁶ Wang Yuhu (1979, p. 124).

¹³⁷ Cited in Wang Yuhu (1979, p. 125).

¹³⁸ Wang Yuhu (1979, p. 125).

¹³⁹ Hu Daojing (1985b, p. 55).

¹⁴⁰ In a recent re-edition (anon., 1993a, p. 357), the publishers mention two authors, Guo Tuotuo (Tang period) and Yu Zongben (Yuan period).

¹⁴¹ Hu Daojing (1962, p. 41).

The next text that we come across consists of one *juan* from a collection of an encyclopaedic nature, the *Shi lin guang ji* 事林廣記. This text is entirely devoted to horticulture, with the first part dealing with flowers, *hua hui lei* 花卉類, followed by a part on fruit trees, *guo shi lei* 果實類, and the last part, which is devoted to bamboos and trees, *zhu mu lei* 竹木類. It was compiled by Chen Yuanjing 陳元靚 and completed in the last years of the Southern Song or the very beginning of the Yuan dynasty, in around 1270.¹⁴² It has been diffused widely in the course of history. Although no copy of the original edition has survived, there are still volumes of later editions produced in the Yuan and Ming periods, as well as a Japanese edition. The contents of these different editions vary. The Japanese edition of 1684 contains only lists of the names of varieties of each of the plant species cited, with no mention of the sources of this information.¹⁴³ A Chinese edition dated 1478, consulted in the Cambridge University Library (UK), mentions a greater number of varieties and also includes extracts of technical information and many references to their authors. One of the interesting features of the collection in this form is that it starts by listing the names of a great number of plant varieties, before describing the cultivation techniques peculiar to the three large categories that are distinguished, namely flowers, fruits and bamboos/trees. This collection thus provides a kind of synthesis of the technical knowledge considered to be fundamental by the compiler, who has plundered information from the various specialised monographs that existed in the 13th century.

Even before the definite establishment of the new Yuan dynasty, the Mongol Emperor Kubilai Khan had entrusted to his Agricultural Extension Bureau, *Si nong si* 司農司, the production of a treatise that would present the knowledge necessary to restore a viable level of agricultural production in a China badly devastated by warfare. This work was soon completed and Wang Pan 王磐, a member of the Han Lin Academy, signed its preface 1273. It was entitled *Nong sang ji yao* 農桑輯要 (The Essentials of Agriculture and the Breeding of Silkworms) and was composed of seven *juan*. A number of general remarks (*juan* 1) were followed by a second part (*juan* 2) on preparing the soil and the seeds to be sown which then detailed the cultivation of the plants that were to provide basic foodstuffs (grains and pulses), oil (from sesame and hemp) and textile fibres (hemp/China grass and *Bombax*). Then came two chapters detailing the cultivation of mulberry trees (*juan* 3) and the raising of silkworms (*juan* 4). We should remember that one of the aims of this manual was to stimulate the production of silk in the regions of northern China in particular.¹⁴⁴ The last *juan* concerned cattle, poultry, fish and bees. Horticulture is discussed in *juan* 5 and 6. The detail of the types of cultivation proposed deserves attention. We shall be noting the richness and diversity of all that is discussed in the categories of

¹⁴² Citations from it can be found in the *Nong sang ji yao* (1273).

¹⁴³ This edition was republished in 1990 by Gu Ji chubanshe, Shanghai.

¹⁴⁴ See *SCC* Volume 6, Part II, pp. 71–2.

vegetables, *gua cai* 瓜菜, and fruits, *guo shi* 果實, in the first of those two *juan*, and then the categories of trees and bamboos, *zhu mu* 竹木, and medicinal plants, *yao cao* 藥草, in the second.

Vegetables: cucumber (*huang gua* 黃瓜), water melon (*xi gua* 西瓜), wax gourd (*dong gua* 冬瓜),¹⁴⁵ Chinese white cucumber (*yue gua* 越瓜),¹⁴⁶ lagenaria gourd (*hu bu* 瓠,¹⁴⁷ its synonym being *hu lu* 葫蘆), taro (*yu yu* 芋),¹⁴⁸ mallow (*kui* 葵),¹⁴⁹ aubergine (*qie zi* 茄子), turnip (*man jing* 蔓菁), radish (*luo bo* 蘿蔔) and carrot (*hu luo bo* 胡蘿蔔), mustards (*shu jie/yun cai/jie zi* 蜀芥/芸菜/芥子 – the first two are cultivated for their leaves, the third for its seeds); ginger (*jiang* 薑), mushrooms (*jun zi* 菌子), garlic (*suan* 蒜), Chinese shallot (*xie* 薤), Chinese onion (*cong* 蔥), Chinese chive (*jiu* 韭), coriander (*hu sui* 胡荽), spinach (*bo leng* 菠薐), asparagus lettuce (*wo ju* 萵苣),¹⁵⁰ garland chrysanthemum (*tong hao* 同蒿),¹⁵¹ amaranth? (*ren xian* 人莧), a Chinese kale (*lan cai* 藍菜),¹⁵² chard (*jun ta* 莧菜),¹⁵³ basil (*lan xiang* 蘭香),¹⁵⁴ *xiang cai* 香菜,¹⁵⁵ *Perilla* (*ren* 荳蔻) and water pepper (*liao* 蓼), a wild lettuce (*qin ju* 芹苣),¹⁵⁶ Chinese artichoke (*gan lu zi* 甘露子).¹⁵⁷

Fruits: pear (*li* 梨), peach (*tao* 桃), cherry (*ying tao* 櫻桃), grape (*pu tao* 葡萄), plum (*li* 李), Japanese apricot (*mei* 梅), apricot (*xing* 杏), apple (*nai* 奈),¹⁵⁸ asiatic apple (*lin qin* 林檎), jujube (*zao* 棗, *ruan zao* 榎棗),¹⁵⁹ sweet chestnut (*li* 栗), hazelnut (*zhen* 榛), kaki (*shi* 柿), pomegranate (*an shi liu* 安石榴), quince (*mu gua* 木瓜), ginkgo (*yin xing* 銀杏), sweet orange (*cheng* 橙),¹⁶⁰ mandarin (*gan* 柑),¹⁶¹ tangerine (*ju* 橘),¹⁶² Chinese quince (*cha* 楂子).¹⁶³

¹⁴⁵ *Benincasa hispida* (Thunb.) Cogn.; anon. (1977b, Fig. 1526).

¹⁴⁶ *Cucumis melo* (L.) var. *conomon* (Thunb.) Mak. (= *C. conomon* Thunb.) (Fèvre and Métaillé 2005, p. 564).

¹⁴⁷ *Lagenaria siceraria* (Molina) Standl. Nowadays, several varieties have been distinguished. According to Li Shizhen, 'the one with head and tail that are identical, is *hu*' (*shou wei ru yi zhe wei hu* 首尾如一者為瓠); this may be the *depressa* Ser. variety; anon. (1977b, Fig. 3683).

¹⁴⁸ *Colocasia esculenta* (L.) Schott; anon. (1977b, Fig. 1672).

¹⁴⁹ *Malva verticillata* L.; anon. (1977b, Fig. 1536).

¹⁵⁰ *Lactuca sativa* L.; anon. (1977b, Fig. 3703).

¹⁵¹ *Chrysanthemum coronarium* Linn. var. *spatiosum* Bailey, according to Herklots (1972, p. 168).

¹⁵² Shi Shenghan (1982, p. 196, n. 70) identifies this vegetable with *Brassica acelepha*, *hong hua jie lan* 紅花芥藍. It is probably a form of Chinese kale, *Brassica alboglabra* Bailey. The text suggests that it is cultivated primarily for its leaves, which are gradually picked off.

¹⁵³ *Beta vulgaris* Linn. var. *cicla* Moq. Herklots (1972, p. 155) notes, 'There are two forms, Spinach beet with entirely green leaves and Seacale beet or Silver beet or Swiss chard in which the mid ribs of the leaves are white'. The text does not specify the colour of the leaves.

¹⁵⁴ *Ocimum basilicum* L.; anon. (1977b, Fig. 2804).

¹⁵⁵ Cited after the previous plant as perfuming the water in which fish are washed; given that coriander and basil, also called *xiang cai*, have already been mentioned in the book, this may be *Elseltzia splendens* Nakai ex F. Maekawa; anon. (1977b, Fig. 3453).

¹⁵⁶ A note gives *ku mai* 苦蕒 as a synonym. This is a wild lettuce *Ixeris denticulata* (Houtt.) Stebb. In Fèvre and Métaillé (2005, p. 256).

¹⁵⁷ *Stachys sieboldii* Miq.; anon. (1977b, Fig. 3289).

¹⁵⁸ *Malus pumila* Mill. (Yu Dejun 1982, p. 98).

¹⁵⁹ *Diospyros lotus* L. ¹⁶⁰ *Citrus sinensis* (L.) Osbeck (Fèvre and Métaillé 2005, p. 449).

¹⁶¹ *Citrus tangerina* Hort. ex Tanaka (Fèvre and Métaillé 2005, pp. 246 and 584).

¹⁶² *Citrus reticulata* Blanco = *Citrus nobilis* Lour. (Fèvre and Métaillé 2005, p. 139).

¹⁶³ *Chaenomeles lagenaria* (Loisel.) Koidz. var. *cathayensis* (Hemsl.) Rehd.

Trees: pine (*song* 松), Chinese arborvitae (*bai* 柏),¹⁶⁴ savin (*gui* 檜),¹⁶⁵ elm (*yu* 榆), poplar (*bai yang* 白楊),¹⁶⁶ pear tree (*tang* 棠),¹⁶⁷ paper mulberry tree (*gu* 穀/*chu* 楮),¹⁶⁸ *Sophora*/Chinese scholar tree (*huai* 槐), willow (*liu* 柳), catalpa (*qiu* 楸),¹⁶⁹ catalpa (*zi* 梓),¹⁷⁰ Chinese parasol tree (*wu tong* 梧桐),¹⁷¹ lacquer tree (*qi* 漆),¹⁷² *Xylosma zuo* (柞),¹⁷³ locust tree (*zao jia* 阜茨),¹⁷⁴ bead tree, China-berry (*lian* 棟),¹⁷⁵ *Cedrela* (*chun* 椿),¹⁷⁶ tree of heaven (*shu* 樗),¹⁷⁷ giant reed (*wei* 葦),¹⁷⁸ silver grass (*ti* 荻),¹⁷⁹ reedmace (*pu* 蒲).¹⁸⁰

Medicinal plants: *zi cao* 紫草,¹⁸¹ *hong hua* 紅花,¹⁸² *lan* 藍,¹⁸³ *zhi zi* 梔子,¹⁸⁴ tea (*cha* 茶), Chinese peppers (*jiao* 椒),¹⁸⁵ *zhu yu* 茱萸,¹⁸⁶ fennel (*hui xiang* 茴香),¹⁸⁷ lotus seeds and rhizome (*lian ou* 蓮藕),¹⁸⁸ euryale/gorgon plant (*qian* 芡),¹⁸⁹ water chestnut (*ji* 芡),¹⁹⁰ yam (*shu yu* 薯蕷),¹⁹¹ *Rehmannia* (*di huang* 地黃),¹⁹² Chinese wolfberry (*gou qi* 枸杞),¹⁹³ chrysanthemum (*ju hua* 菊花),¹⁹⁴ *Atractylodes* (*cang zhu* 蒼朮),¹⁹⁵ Solomon seal (*huang jing* 黃精),¹⁹⁶ lily (*bai he*

¹⁶⁴ Cf note 70, *Biota orientalis*. ¹⁶⁵ *Sabina chinensis* (L.) Antoine; anon. (1977b, Fig. 3660).

¹⁶⁶ *Populus davidiana* Dode; anon. (1977b, Fig. 1413).

¹⁶⁷ According to Li Shizhen, cited in anon. (1977b, Fig. 4924), this is the variety with white flowers of the *dang li* 棠梨, *Pyrus betulafolia* Bge.

¹⁶⁸ *Broussonetia papyrifera* (L.) Vent.; anon. (1977b, Fig. 4754).

¹⁶⁹ *Catalpa bungei* C. A. Mey.; anon. (1977b, Fig. 5075).

¹⁷⁰ *Catalpa ovata* C. A. Mey.; anon. (1977b, Fig. 4091).

¹⁷¹ *Firmiana simplex* (L.) W. F. Wight; anon. (1977b, Fig. 4071).

¹⁷² *Rhus verniciflua* Stokes; anon. (1977b, Fig. 0131, p. 72).

¹⁷³ *Xylosma japonicum* (Walp.) A. Gray; anon. (1977b, Fig. 3149).

¹⁷⁴ *Gleditsia sinensis* Lam.; anon. (1977b, Fig. 2326). ¹⁷⁵ *Melia* sp., probably *Melia azedarach* L.

¹⁷⁶ *Toona sinensis* (A. Juss.) Roem. = *Cedrela sinensis* A. Juss.; anon. (1977b, Fig. 5067). Today, the current Chinese name is *xiang chun* 香椿, fragrant *chun*, as opposed to the name of the ailanthus. Cf next note.

¹⁷⁷ *Ailanthus altissima* (Mill.) Swingle; anon. (1977b, Fig. 5422). The present-day Chinese name is *chou chun* 臭椿, stinking *chun*. Cf previous note.

¹⁷⁸ *Phragmites communis* Trin.; anon. (1977b, Fig. 2191).

¹⁷⁹ *Miscanthus sacchariflorus* (Max.) Benth. and Hook. f. (Fèvre and Métailié 2005, p. 102). ¹⁸⁰ *Typha* sp.

¹⁸¹ *Lithospermum erythrorhizon* Sieb. et Zucc.; anon. (1977b, Fig. 4862). The dried root is today used for its refreshing and detoxifying properties.

¹⁸² *Carthamus tinctorius* L.; anon. (1977b, Fig. 1999). The dried flower clusters are today used for their emmenagogic, fluidifying and antalgic properties.

¹⁸³ This generic term designates plants that produce an indigo dye. As Wu Qijun already indicates in the *Zhi wu ming shi tu kao* 植物名實圖考 (1848), several plants fit this description: one at least that springs to mind is the pastel *Isatis tinctoria* L. (*song lan* 松藍) and an indigo *Baphicacanthus cusia* (Nees) Brem. (*ma lan* 馬藍). These are roots that are used as *materia medica*. Today they are recognised as possessing refreshing, detoxifying and fluidifying properties. Anon. (1977b, Fig. 2548).

¹⁸⁴ *Gardenia jasminoides* Ellis; anon. (1977b, Fig. 4084).

¹⁸⁵ *Zanthoxylum* sp. Six species and varieties are used for medicinal purposes and as food; anon. (1977b, Fig. 2152).

¹⁸⁶ Probably for *wu zhu yu* 吳茱萸, *Evodia rutaecarpa* (Juss.) Benth. See note 128 above.

¹⁸⁷ *Foeniculum vulgare* Mill.; anon. (1977b, Fig. 3306). ¹⁸⁸ *Nelumbo nucifera* Gaertn.; anon. (1977b, Fig. 3691).

¹⁸⁹ *Euryale ferox* Salisb.; anon. (1977b, Fig. 2183). ¹⁹⁰ *Trapa bispinosa* Roxb.; anon. (1977b, Fig. 4100).

¹⁹¹ *Dioscorea opposita* Thunberg; anon. (1977b, Fig. 0319).

¹⁹² *Rehmannia glutinosa* (Gaertn.) Libosch.; anon. (1977b, Fig. 0133).

¹⁹³ *Lycium chinense* Mill.; anon. (1977b, Fig. 3163).

¹⁹⁴ *Chrysanthemum morifolium* Ramat.; anon. (1977b, Fig. 4127).

¹⁹⁵ *Atractylodes* sp. The rhizome of several species of this member of the Compositae is used as a tonic; anon. (1977b, Fig. 2174).

¹⁹⁶ *Polygonatum* sp. The rhizome of several species close to *Polygonatum* is used under this name as a tonic; anon. (1977b, Fig. 4157).

百合),¹⁹⁷ great burdock (*niu pang zi* 牛蒡子),¹⁹⁸ cassia (*jue ming* 決明),¹⁹⁹ sugar cane (*gan zhe* 甘蔗),²⁰⁰ Job's tears (*yi yi* 薏苡),²⁰¹ wisteria (*teng hua* 藤花),²⁰² mint (*bo he* 薄荷),²⁰³ opium poppy (*ying su* 罌粟),²⁰⁴ alfalfa (*mu xu* 苜蓿).²⁰⁵

Given that the book is not an encyclopaedic collection but a practical handbook, this list strikes me as particularly interesting as it both reflects traditional cultivation and makes new suggestions. The information relating to known cultivations is all based on earlier texts, in particular the *Qi min yao shu* and the *Si shi lei yao*, while new data are indicated as 'new additions', *xin tian* 新添. The new items among the vegetables are the asparagus lettuce, the chrysanthemum, the amaranth and the white beet. In the fruit section, the text explains how to cultivate ginkgos and advises trying to introduce in the north the three orange trees and also the quince tree. In the tree section, the new items include a technical detail for the extraction of latex from the lacquer tree, a method for getting the Chinese honey locust tree to produce fruit (the insertion of a pin of wood in a previously tapped tree, which is then sealed in), the way to cultivate China-berries, cedrellas, reeds and typhas. It is suggested that four new medicinal plants be cultivated, sugar cane, Job's tears, wisteria and mint, to which the lyciet plant (Chinese wolfberry) is then added. The authors seem to me to be characterised by a common concern to pass on tried and tested knowledge. To this end, the text draws on numerous references to earlier literature, at the same time endeavouring to produce a synthesis (as we shall soon be seeing in connection with grafting techniques) and also introducing new plants. As Francesca Bray has remarked,²⁰⁶ it is probably thanks to its wide diffusion that this handbook played an important role in the popularisation of cultivation techniques throughout all regions in China.

Two works followed on directly from it, the *Nong shu* 農書 (Book on Agriculture) (1313) by Wang Zhen 王禎 and the *Nong sang yi shi cuo yao* 農桑衣食撮要 (Selected Essentials of Agriculture, Sericulture, Clothing and Food) (1314) by Lu Mingshan 魯明善.²⁰⁷ Much of the former, in particular eight of its ten chapters, concerns horticulture.²⁰⁸ They are arranged under the general title *Bai gu pu* 百穀譜 (Treatise on All Grains): *luo shu* 蓀屬, 'genus of the fruits of grasses' (Chapter 3); *shu shu* 蔬屬,

¹⁹⁷ *Lilium* sp. The scales from the bulbs of various species of lily are used, under this name, as calming and anti-cough remedies; anon. (1977b, Fig. 1728).

¹⁹⁸ *Arctium lappa* L.; anon. (1977b, Fig. 0861).

¹⁹⁹ *Cassia tora* L. Cassia seeds are diuretic and laxative; anon. (1977b, Fig. 1906).

²⁰⁰ *Saccharum sinensis* Roxb.; anon. (1977b, Fig. 1190). On the history of cane sugar in China, see *SCC* Volume 6, Part III, pp. 51–479.

²⁰¹ *Coix lachryma-jobi* L. The seeds possess tonic, febrifuge and anti-oedematous properties; anon. (1977b, Fig. 5548).

²⁰² *Wisteria sinensis* Sweet. Cf Gao Minggan (2006, p. 483).

²⁰³ *Mentha haplocalyx* Briq. Cf anon. (1977, no 5553). ²⁰⁴ *Papaver somniferum* L.; anon. (1977b, Fig. 5342).

²⁰⁵ *Medicago sativa* L.; anon. (1977b, Fig. 2677). ²⁰⁶ Bray, *SCC* Volume 6, Part I, 72.

²⁰⁷ The modern annotated edition is the work of Wang Yuhu; see Lu Mingshan (1962).

²⁰⁸ Pp. 94 to 168 in Wang Yuhu's edition (1981a). For a study of this text, see *SCC* Volume 6, Part I, pp. 59–64.

'genus of vegetables' (Chapters 4 and 5); *guo shu* 果屬, 'genus of fruits' (Chapters 6, 7; and 8); *zhu mu* 竹木, 'trees and bamboos' (Chapter 9); and *za lei* 雜類, 'category of various items' (Chapter 10). It should be noted that under slightly different classification terms, Wang Zhen includes pretty well all the plants mentioned in the *Nong sang ji yao*, together with a few additions. Where the latter work has a single category covering all vegetables, *gua cai lei* 瓜菜類, 'category of gourds and vegetables', Wang Zhen divides them into two 'genera', *luo shu* 蘿屬 and *shu shu* 蔬屬. However, if the layout is almost identical, the contents of each of the rubrics is in some cases noticeably different since, alongside cultivation techniques, Wang Zhen shows a particular interest in possible uses, which he always mentions. He adds some very interesting information. In the *luo shu* 蘿屬, 'genus fruits of grasses'²⁰⁹ – translated thus in accordance with the definition in the *Shuo wen jie zi* – there is a new entry, *tian gua* 甜瓜,²¹⁰ 'sweet gourd', the melon, to which *hu gua* 胡瓜 is annexed, together with a synonym, *huang gua*, the cucumber.²¹¹ Wang Zhen points out that there are gourds used as fruits, *guo gua* 果瓜, and others used as vegetables, *cai gua* 菜瓜, such as the cucumber, *hu gua* 胡瓜, and the Chinese white cucumber, *yue gua* 越瓜. As for gourd-fruits, there are an incalculable number of different kinds, *pin lei* 品類, he notes, and these are named according to the criteria of shape or form – for example *long gan* 龍肝, 'dragon's liver'; *hu zhang* 虎掌, 'tiger's paw' – or else according to colour – *wu gua* 烏瓜, 'black gourd'; *xiao qing* 小青, 'small greenish' – but not according to taste, for they are all sweet and sweet-smelling. He notes that there are two kinds of cucumber, the one dark green and the other white, and that *yue gua*, which is always white, is for that reason also called *bai gua* 白瓜, 'white gourd'. Three other entries are devoted to the water melon, *xi gua* 西瓜;²¹² the waxen gourd, *dong gua* 冬瓜; and the calabash, *hu* 瓠.²¹³ Wang Zhen notes that the first is cultivated mostly in the lower Yangzi valley, present-day Zhejiang, and also in Fujian, and that it is regarded as a veritable ambrosia. The reason why the waxen gourd is called 'winter gourd' is that it ripens in that season. It is cultivated in all gardens for, quite apart from its late time of ripening, it is the only gourd that can be preserved for a long time. Furthermore, although it is mainly eaten as a vegetable, its flesh preserved in honey can also be enjoyed as an accompaniment to tea.²¹⁴ Passing on next to calabashes, Wang Zhen notes that there are two major categories, the sweet ones and the bitter ones. Only the former are eaten, the rest being destined to be used as utensils of various kinds. It was certainly for the latter purpose

²⁰⁹ 'Genus', here, should be understood as a level of classification lower than *lei*, rather than as the level above species in modern taxonomies. See pp. 54–6 in the chapter devoted to classification in the *Er ya*.

²¹⁰ *Cucumis melo* L. ²¹¹ It is worth noting that *huang gua* was the major name in the *Nong sang ji yao*.

²¹² *Citrullus lanatus* (Thunb.) Mansfeld (= *C. vulgaris* Schrad.).

²¹³ *Lagenaria siceraria* (Molina) Standl. var. *clavata* Ser.; anon. (1977b, Fig. 4275).

²¹⁴ One of the sweets sold in the shops of Nankin between 1964 and 1966 was *tang dong gua*, which consisted of thin slivers of the flesh of this gourd, shaped into extremely tasty little rectangular sticks five or six centimetres long dipped in sugar.

that cultivators tried to produce very large ones. To that end, Wang Zhen cites two methods taken from the *Qi min yao shu* and the *Si shi lei yao*, which will be described below, along with grafting techniques. He concludes by emphasising the economic importance of calabashes; this is an excellent vegetable that is essential in any cuisine; furthermore, depending on their size, these fruits can be used as a variety of utensils such as jars and ladles, while the rind and the flesh also serve as food for the pigs: 'there is nothing to throw away!' The other plants included in this genus are the taro, *yu* 芋; the turnip, *man jing* 蔓菁²¹⁵ or *wu jing* 蕪菁; the radish-turnip, *luo bo* 蘿蔔; the aubergine, *qie zi* 茄子; ginger, *jiang* 薑; the seeds and rhizome of the lotus, *lian ou* 蓮藕; the euryale, *qian* 芡; and finally the water caltrop, *ji* 芡 or *ling* 菱. So this first genus includes gourds, roots, tubers and seeds, a collection that somewhat extends the second genus of grains that precedes it and is dominated by various leguminous plants. Plants of the 'vegetable genus' are the subject of the next two chapters. Essentially, these are leaf vegetables, various kinds of *Allium* and aromatic plants. The first chapter includes, successively, the mallow, *kui* 葵; 'the principal of all vegetables',²¹⁶ *jie* 芥; the various mustards, *yun tai* 芸薹 and *jie*; garlic, *suan*; Chinese shallot (rakkyo), *xie*; and the Chinese onion, *cong* 蔥. The second part contains the Chinese chive, *jiu* 韭; coriander, *hu sui* 胡荽; spinach, *bo leng* 菠薐; asparagus lettuce, *wo ju* 萵苣; chrysanthemum, *tong hao* 同蒿; amaranth, *ren xian* 人莧; cabbage, *lan cai* 藍菜;²¹⁷ beet, *jun ta* 蓴蓬; basil, *lan xiang* 蘭香; *Perilla*, *ren* 荏; water pepper, *liao* 蓼; Chinese celery, *qin* 芹; the lettuce, *ju*;²¹⁸ and knotroot, Chinese artichoke, *gan lu zi*.

In this presentation of vegetables, Wang Zhen, in comparison to the sketchy treatment of the same vegetables in the *Nong sang ji yao*, adopts a more concrete approach that reveals him to be an acute observer of both cultivation and eating practices. For fruit trees, however, he faithfully follows the order of presentation adopted in the *Nong sang ji yao*, systematically repeating all the plants cited, the various rubrics being classified under the title *guo shu* 果屬, 'genus of fruits', and divided into three chapters. He does, however, suggest a few additions to the *Nong sang ji yao* list, inserting them among the original entries; for instance, after the chestnut tree, he mentions the mulberries of the mulberry tree, *sang shen* 桑椹, and after the kaki he inserts the litchi, *li zhi* 荔枝; the longan, *long yan* 龍眼; and the Chinese olive, *gan lan* 橄欖. He advises the use of the first of those as valuable foodstuffs in times of famine and cites a number of historical examples. The rest of those entries testify to Wang Zhen's interest in very localised semi-tropical cultivations. As for trees, out of the entries in the *Nong sang ji yao*, the *Nong shu* retains only the following: pine, cypress, sabine, elm, willow, *Xylosma*, *Melia*, paper mulberry, the honey locust tree, reeds, silver grass (*di* 荻) and the lacquer tree. In the last chapter of this series devoted to cultivated plants, Wang Zhen presents other plants

²¹⁵ *Brassica rapa* L.; cf Li Hui-Lin (1969).

²¹⁶ *Wei bai cai zhi zhu* 為百菜之主 (Wang Yuhu 1981a, p. 107).

²¹⁷ *Brassica oleracea* L. var. *capitata* L.; anon. (1977b, Fig. 1189).

²¹⁸ *Lactuca* sp.

of economic interest under the title *za lei*, 'category of diverse plants'. He begins with the ramie (grass-cloth plant), *zhu ma* 苧麻,²¹⁹ followed by the *Bombax*, *mu mian* 木綿.²²⁰ These plants had only recently begun to be cultivated in China; the *Nong sang ji yao* had recalled their distant origins, whereas Wang Zhen notes the progressive advance of the *Bombax* in a number of southern provinces.

The *Nong sang yi shi cuo yao* 農桑衣食撮要 (Selected Essentials of Agriculture, Sericulture, Clothing and Food) (1314) is exactly contemporary with the last work.²²¹ Lu Ming-shan 魯明善, its author, was a Uighur whose personal name was Tiezhu 鐵柱.²²² Apart from the cultivation of mulberry trees and the raising of silkworms, most of this treatise is directly devoted to horticulture. As Wang Yuhu suggests and the author hints in a preface dated 1332, the work is a supplement to the *Nong sang ji yao*. The author composed it while acting as an official in Shouzhou 壽州, today Shouxian 壽縣, in Anhui province.²²³ Wang Yuhu thinks that there were at least two editions of it under the Yuan,²²⁴ in 1314 and 1330.²²⁵ The work was widely diffused during the Ming and the Qing dynasties. Its success is certainly due to two factors: its intrinsic technical quality and the precision and ease of its style.²²⁶ It should, however, be noted that the editor of the contemporary edition, Wang Yuhu, points out at the very start of his preface that the later editions present numerous problems and that the text that he has restored is based on incomplete earlier works and because of this contains a number of uncertain passages.²²⁷

The treatise takes the form of an agricultural calendar that sets out the activities to be carried out in each month of the year. Those that directly concern the cultivation of plants provide valuable evidence on the whole group of plants cultivated in the first half of the 14th century in the region of today's Anhui province. Clearly those activities were of a very diverse nature. Among the trees, the mulberry tree, *sang shu* 桑樹,²²⁸ was obviously of crucial importance for the production of silk. As well as the mulberry tree, the author several times cites 'all the fruit-bearing trees', *zhu se guo mu shu* 諸色菓木樹, and again the smaller category of those that produce fruit with stones: peach trees, apricot trees, plum trees and Japanese apricot trees, *tao xing li mei* 桃杏李梅. Other fruit trees are specifically mentioned: the Chinese jujube 棗, *zao*,²²⁹ the pomegranate, 石榴 *shi liu*,²³⁰ the vine, 葡萄 *pu tao*,²³¹ the ginkgo, 銀杏 *yin xing*,²³² the Chinese wolfberry, 枸杞 *gou qi*,²³³ the Chinese quince, 木瓜 *mu gua*,²³⁴ the kaki, 柿 *shi*,²³⁵ and also the mulberry, the fruits

²¹⁹ *Bohemeria nivea* (L.) Gaud. (= *Urtica nivea* L.).

²²⁰ The text of the contemporary edition (Wang Yuhu 1981a) writes *mu mian* 木綿, but certainly refers to the same tree, as is attested by a citation (ibid., p. 161) in the *Nong sang ji yao* on the subject of the *mu mian* 木棉 (Shi Shenghan 1982, pp. 50–3).

²²¹ The modern annotated edition is the work of Wang Yuhu; see Lu Mingshan (1962).

²²² Wang Yuhu (1979, p. 113). ²²³ Wang Yuhu (1979, p. 113). ²²⁴ Lu Mingshan (1962, p. 5).

²²⁵ Wang Guoding (1984, p. 57) believes that these were the only two editions produced under this dynasty.

²²⁶ Wang Yuhu (1964, p. 113); Fang Binguan et al. (1933, p. 1577). ²²⁷ Lu Mingshan (1962, p. 1).

²²⁸ *Morus* sp. ²²⁹ *Zizyphus jujuba* Mill. (= *Z. sativus* Gaertn.) ²³⁰ *Punica granatum* L. ²³¹ *Vitis vinifera* L.

²³² *Ginkgo biloba* L. ²³³ *Lycium chinense* Mill. ²³⁴ *Chaenomeles sinensis* (Thouin) Koehne.

²³⁵ *Diospyros kaki* L.

of which are harvested even though it is cultivated primarily⁴ for its leaves. Another tree that is of dietary and economic interest is the tea tree, 茶 *cha*.²³⁶ As for other trees that are cultivated for non-dietary purposes, there is first the category of 'pines and cypresses', *song bai* 松柏/栢, and the willows, 柳 *liu*.²³⁷ The trees or shrubs specifically named are, among large trees with evergreen foliage, Chinese fir, 杉 *shan*,²³⁸ and Chinese juniper, 檜 *gui*.²³⁹ The other trees of economic interest are the paper mulberry, *gu/chu* 穀/楮;²⁴⁰ the Chinese honey locust, *zao jia* 皂莢;²⁴¹ the silk-cotton tree, *mu mian* 木棉;²⁴² Cape jasmine, *zhi zi* 梔子;²⁴³ the Japanese varnish tree, *qi* 漆;²⁴⁴ the Chinese scholar tree, *huai* 槐;²⁴⁵ the Siberian elm tree, *yu* 榆;²⁴⁶ and bamboos, *zhu* 竹 (considered as trees).

The list of herbaceous plants is equally rich. As well as the grains that constitute staple food, a variety of 'gourds', starting with the aubergine or eggplant, *qie* 茄; two bottle gourds, *pao* 匏 and *hu lu* 葫蘆;²⁴⁷ wax gourd, *dong gua* 冬瓜;²⁴⁸ cucumber, *huang gua* 黃瓜;²⁴⁹ snake gourd, *cai gua* 菜瓜;²⁵⁰ 'late gourd', *wan gua* 晚瓜; watermelon, *xi gua* 西瓜;²⁵¹ musk melon, *tian gua* 甜瓜.²⁵²

The category of pulses is also well represented: adzuki bean, *xiao dou* 小豆;²⁵³ ?black pea, *wan wu dou* 豌豆;²⁵⁴ soya bean, *da dou* 大豆;²⁵⁵ 'black soya bean', *hei dou* 黑豆;²⁵⁶ red and white cultivars of cowpea, *hong/bai jiang dou* 紅/白豇豆;²⁵⁷ mung bean, *liu dou* 莢豆;²⁵⁸ and big green pea, *da pi dou* 大脾豆.²⁵⁹

The category of leaf vegetables is equally rich: wild lettuce, *ku mai* 苦蕒;²⁶⁰ asparagus lettuce, *wo ju* 蒿苣;²⁶¹ garden lettuce, *sheng cai* 生菜;²⁶² Chinese white

²³⁶ *Camelia sinensis* (L.) Kuntze (= *Thea sinensis* L.) ²³⁷ *Salix* sp. ²³⁸ *Cunninghamia lanceolata* (Lamb.) Hook.

²³⁹ *Sabina chinensis* (L.) Antoine (= *Juniperus chinensis* L.) ²⁴⁰ *Broussonetia papyrifera* Vent.

²⁴¹ *Gleditsia sinensis* Lam. (= *G. macrantha* Desf.).

²⁴² *Gossampinus malabaricum* (DC.) Merr. (= *Bombax malabaricum* DC.).

²⁴³ *Gardenia jasminoides* Ellis (= *Gardenia florida* L.). ²⁴⁴ *Rhus verniciflua* Stokes (= *R. vernicifera* DC.).

²⁴⁵ *Sophora japonica* L. ²⁴⁶ *Ulmus pumila* L.

²⁴⁷ Two cultivars of *Lagenaria siceraria* (Molina) Standl. (= *L. leucantha* Rusby, = *L. vulgaris* Seringe (Mansfeld 1962, p. 427)). Numerous cultivars of this gourd are cultivated in China and in Japan. The two names, which are today regarded as synonymous (Wu Gengmin 1957, p. 382), must here designate different things. There were a number of different ways of using the fruits as food – eaten as vegetables when young or else after the flesh of the adult fruit had been dried and cut up (known in Japan specifically as *kanpiō* 乾瓢 (Motoyama 1980, p. 139)) – and also of making containers out of the husk of the dried fruit, or as a product of *materia medica*. This suggests that different shapes were cultivated for different purposes. According to Li Shizhen (1975–81, p. 1692) *pao* designates a variety of fruit with a round shape. It therefore seems likely that, in the 16th century, *hu lu* referred to the shapes of long fruit.

²⁴⁸ *Benincas hispida* (Thunb.) Cogn. (= *B. cerifera* Savi). ²⁴⁹ *Cucumis sativus* L.

²⁵⁰ *Cucumis melo* L. var. *flexuosus* Naud. (= *C. flexuosus* L.).

²⁵¹ *Citrullus lanatus* (Thumb.) Mansfeld (= *C. vulgaris* Schrad.). ²⁵² *Cucumis melo* L.

²⁵³ *Phaseolus angularis* Wight (= *Vigna angularis* (Willd) Ohwi and Ohashi). ²⁵⁴ ? *Pisum sativum* L.

²⁵⁵ *Glycine max* (L.) Merr.

²⁵⁶ *Glycine max* (L.) Merr. A soya cultivar with black seeds. Li Shizhen (1975–81, p. 1999) suggests that black soya was medicinal as well as edible.

²⁵⁷ Probably two cultivars of *Vigna sinensis* (L.) Savi ex Hassk. (= *V. unguiculata* L. subsp. *cylindrica*).

²⁵⁸ *Vigna radiata* (L.) R. Wilczek (= *Phaseolus radiatus* L.).

²⁵⁹ *Pisum sativum* L. Identification based on the fact that *pi* and *wan* 豌豆 are synonymous.

²⁶⁰ *Ixeris denticulata* (Houtt.) Stebb. (= *Lactuca denticulata* (Houtt.) Maxim.).

²⁶¹ *Lactuca sativa* L. var. *angustana* Bailey.

²⁶² *Lactuca sativa* L. My choice of a translation is justified by the remarks of Hu Shiu-ying (2005, pp. 739–40).

cabbage, *song cai* 菘菜;²⁶³ Chinese mustard, *jie cai* 芥菜;²⁶⁴ an early cultivar of mustard, *si yue jie* 四月芥; spinach, *po cai* 菠菜;²⁶⁵ chard, *jun ta cai* 莙薹菜;²⁶⁶ and curly mallow, *kui cai* 葵菜.²⁶⁷ The following may be added to this list: shepherd's purse, *ji cai hua* 薺菜花;²⁶⁸ the young leaves of lyciet (Chinese wolfberry), cited above for its edible and medicinal fruits; and the young shoots of hollyhock, *shu kui* 蜀葵.²⁶⁹

Root vegetables are represented by Chinese radish, *luo bo* 蘿蔔;²⁷⁰ summer Chinese radish, *xia luo bo* 夏蘿蔔;²⁷¹ carrot, *hu luo po* 胡蘿蔔;²⁷² turnip, *man jing* 蔓菁;²⁷³ taro, *yu* 芋;²⁷⁴ yam, *shan yao* 山藥;²⁷⁵ and arrowhead, *ci gu* 茭菰.²⁷⁶ Finally, there are more highly prized products: lilies, *bai he* 百合²⁷⁷ the bulb scales of which are used; bamboo shoots, *sun* 笋, the base of stems of 'water bamboo', *jiao sun* 茭筍, swollen by a parasite mushroom (*Ustilago esculenta* Henning);²⁷⁸ and the seeds and rhizome of lotus, *ou lien* 藕蓮.²⁷⁹

To add flavour to dishes, there are a spice, 'Chinese pepper', *jiao* 椒;²⁸⁰ Chinese onion, *cong* 蔥;²⁸¹ Chinese chive, *jiu* 韭;²⁸² Chinese shallot (rakkyo) *xie*, 薤;²⁸³ a garlic, *suan* 蒜;²⁸⁴ and ginger, *jiang* 薑.²⁸⁵ Finally, aromatic plants – beefsteak plant, *zi su* 紫蘇;²⁸⁶ coriander, *xiang cai* 香菜;²⁸⁷ fennel, *hui xiang* 茴香;²⁸⁸ and safflower, *hong hua* 紅花²⁸⁹ – complete the list of condiment plants. Two sources of oil are also mentioned: hemp seed, *ma zi* 麻子,²⁹⁰ and sesame, *zhi ma* 芝麻.²⁹¹

To complete this list, there is also the lotus, referred to by the term *fu rong* 芙蓉, which designates both the flower and the leaf, while the rhizome and seed are designated by *ou lien*, 藕蓮. No doubt hemp was also used as a source of textile fibres, as was ramie or China-grass, *zhu ma* 苧麻.²⁹² Plants for dying are also cited, testifying to the importance of weaving in the local economy: the gromwell, *zi cao* 紫草,²⁹³ which produces a purple dye, and two indigos, *lan* 藍 and *dian* 靛.²⁹⁴ Finally, there are two plants with names that seem to me to refer to categories rather than to clearly designated species, the 'brooms', *tiao zhou* 笤帚/帚, and 'grasses for plaiting', *ru cao* 蓆草.

²⁶³ *Brassica chinensis* Juslen. ²⁶⁴ *Brassica juncea* (L.) Czern. and Coss. (= *Sinapis juncea* L.).

²⁶⁵ *Spinacia oleracea* L. ²⁶⁶ *Beta vulgaris* L. var. *cicla*. ²⁶⁷ *Malva verticillata* L. (= *M. crispa* L.).

²⁶⁸ *Capsella bursa-pastoris* L. Li Shizhen (1975–81, p. 1648) certainly notes that there are several kinds of *ji*; I think this is the capsella. On this point, see Haudricourt and Métaillé (1994, pp. 386–91).

²⁶⁹ *Althea rosea* (L.) Cavan. Li Shizhen (1975–81, p. 1042). ²⁷⁰ *Raphanus sativus* L.

²⁷¹ *Raphanus sativus* L. var. ²⁷² *Daucus carota* L. var. *sativa* DC. ²⁷³ *Brassica rapa* L. (= *B. campestris* L.).

²⁷⁴ *Colocasia esculenta* (L.) Schott (= *Anum esculentum* L.) ²⁷⁵ *Dioscorea opposita* Thunb.

²⁷⁶ *Sagittaria sagittifolia* L. ²⁷⁷ *Lilium* sp. The edible part consists of the scales on the bulb.

²⁷⁸ *Zizania latifolia* Turcz. (= *Z. caduciflora* (Turcz.) Hand.-Mazz.). See Hu Daojing (1985b, pp. 145–9).

²⁷⁹ *Nelumbo nucifera* Gaertn. ²⁸⁰ *Zanthoxylum* sp. ²⁸¹ *Allium fistulosum* L.

²⁸² *Allium tuberosum* Rottler ex Spreng. ²⁸³ *Allium bakeri* Regel (= *A. chinense* G. Don.). ²⁸⁴ *Allium* sp.

²⁸⁵ *Zingiber officinale* Rosc. ²⁸⁶ *Perilla frutescens* Britt. var. *crispa* Decne. ²⁸⁷ Probably *Coriandrum sativum* L.

²⁸⁸ *Foeniculum vulgare* Mill. ²⁸⁹ *Carthamus tinctorius* L. ²⁹⁰ *Cannabis sativa* L. ²⁹¹ *Sesamum indicum* L.

²⁹² *Bohemeria nivea* (L.) Gaud. ²⁹³ *Lithospermum erythrorhizon* Sieb. et Zucc.

²⁹⁴ These two names in fact refer to several plants that produce the colour indigo, according to the *Zhi wu ming shi tu kao*: see p. 662 in the Conclusion below. In the various regions, they must have corresponded to a particular botanical species.

The last text relating to horticulture composed by an official under the Yuan comes from Wang Rumao 王汝懋. It is the fourth part of a collection entitled *Shan ju si yao* 山居四要 (1360) (The Four Essentials for a Home in the Mountains). The author's personal name, *zi*, was Yijing 以敬 and he was a native of Fuliang 浮梁, today Jingdezhen 景德鎮 in Jiangxi province, which is famous for its pottery. Wang Yuhu considers that the contents of the chapter entitled 'Zhi sheng', 'Earning One's Living', the form of which resembles that of the treatise by Lu Mingshan cited above, is, however, not comparable from the point of view of its value.²⁹⁵ Nevertheless this treatise does likewise illustrate the seriousness with which the composers of agricultural works published under the Yuan dynasty went about their task.

For the Ming period, the author of the first text, Wang Shimao 王世懋 (1536–88),²⁹⁶ was the younger brother of Wang Shizhen 王世貞, who had written the preface to Li Shizhen's *Ben cao gang mu*.²⁹⁷ Wang Shimao was a native of Taicang 太倉, close to present-day Shanghai; his personal name, *zi*, was Jingmei 敬美, and his surname Sunchai Daoren 損齋道人. He qualified as *jin shi* in 1559 and then occupied a succession of minor administrative positions. He was passionately fond of literature and left a number of collections of literary texts as well as the *Xue pu za shu* 學圃雜疏 (Various Reflections on the Study of Gardening) (1587), which is what interests us here.²⁹⁸ The originality of this little treatise is that it is based on personal experience acquired in the garden of its author.²⁹⁹ The original edition appears in the collection entitled *Wang feng chang za zhu* 王奉常雜著 (Miscellanies of Mr Wang). A number of later texts are incomplete, including the one to be found in the *Shuo fu xu*. A recent edition,³⁰⁰ the various parts of which are complete but are not divided into three *juan*, corresponds to the description given in the *Si ku quan shu zong mu* 四庫全書總目.³⁰¹ After a short author's preface, the text is divided into six 'commentaries', *shu* 疏, that concern, respectively, flowers, *hua shu* 花疏; fruits, *guo shu* 果疏; vegetables, *shu shu* 蔬疏, including aquatic plants, *shui cao* 水草; gourds, *gua shu* 瓜疏; pulses, *dou shu* 豆疏; and bamboos, *zhu shu* 竹疏. This division of the text conveys precise information on the cultivations carried out in gardens, *pu* 圃. It also confirms the distinct place occupied by gourds and pulses as opposed to 'vegetables'. In his preface the author writes that, in his old age, he 'only enjoys cultivating amazing flowers'.³⁰² And, indeed, his text does reflect great familiarity with the flowers that he describes and also his very eclectic taste. In Part I, he cites more than seventy plant species and varieties that are interesting because of the flowers that they produce. For each one, he provides details: how he obtained a plant of one and

²⁹⁵ Wang (1964, p. 117). ²⁹⁶ Cf Hung Mingshui (1976, pp. 1406).

²⁹⁷ Cf SCC Volume 6, Part I, p. 310, note e.

²⁹⁸ For a detailed presentation of his biography, see Hung Mingshui (1976).

²⁹⁹ Wang Yuhu (1979, p. 150).

³⁰⁰ Wang Shimao, in anon. (1993a, pp. 314–24).

³⁰¹ *Si ku quan shu zong mu*, p. 1004.

³⁰² *Du ai zhong qi hua* 獨愛種奇花; see Wang Shimao in anon. (1993a, p. 314).

what he particularly likes about it. The term that I have translated as ‘amazing’ (*surprenant* in French) is *qi* 奇, which can also mean ‘exceptional’, ‘magical’, ‘rare’ and so on. A number of examples show what Wang Shimao really means. He says that although the flower of an apricot tree is not exceptional in itself, it is when these trees ‘form a forest’ that it is so beautiful. Similarly, Chinese redbuds (*zi jing* 紫荊),³⁰³ Japanese plum trees (*yu li* 郁李)³⁰⁴ and Chinese snowball trees (*xiu qiu* 綉球)³⁰⁵ are by no means uncommon but he declares that it is hard to disparage them, for it is they that illuminate the springtime.³⁰⁶ In this way, the text is particularly interesting in that it helps us to understand the author’s aesthetic sensibility. Alongside such expressions of appreciation, we also find practical and precise details that testify to the author’s intimate knowledge of his plants. On the subject of the sword leaf *Cymbidium*, *jian lan* 建蘭³⁰⁷ he mentions its extreme sensitivity to wind, to the cold, to rodents, to earthworms and to ants. Ants like the sweetness of its root and he advises chasing them away by frequent watering. He describes a little shelter that he has devised surrounded by two straw mats where he slightly hollowed out the soil, into which he puts his pots. On sunny, windless days, the shelter is opened up to allow the sun in. As a result, he writes, out of thirty or so plants there is not a single one that does not flower. He then cites more than twenty species of fruit tree, some of them with several varieties. He notes the early production of fruit by some of them, such as cherry trees. He is remarkably sensitive to the problems of adaptation faced by trees and shrubs imported from other regions, noting incompatibilities of climate and also of different soils and describing the negative effects produced by these as compared to what he was able to observe in the trees’ places of origin. The chapter on vegetables contains other interesting information about how he operates: he identifies all the vegetables cultivated in his home region and points out the ones that are not growing in his garden on account of his Daoist compunctions. His garden thus excludes not only plants such as Chinese onions, and various other onions and garlicks, but also carrots and coriander, all of which he classifies in the category of *wu hun* 五葷, ‘kitchen-garden plants with a strong smell’, from which Buddhists and Daoists generally abstain. Even if practically no cultivation techniques are described in this text, he nevertheless occasionally explains reasons for distinguishing kitchen-garden crops from those produced by major cultivation operations. For instance, as has already been noted, in the chapter on pulses³⁰⁸ we read that because soya, *shu* 菽,³⁰⁹ ‘belongs to the Five Grains (*wu gu* 五穀), it is not a plant for gardens’.³¹⁰ But Wang Shimao adds that he nevertheless does cultivate, as one of his garden’s small flowers, one particular variety with large tasty grains that make a nice snack. As for bamboos, he does no more than list those that

³⁰³ *Cercis chinensis* Bge.³⁰⁴ *Prunus japonica* Thunb.³⁰⁵ *Viburnum macrocephalum* Fortune.³⁰⁶ Wang Shimao, in anon. (1993a, p. 315).³⁰⁷ *Cymbidium ensifolium* (L.) Sw.³⁰⁸ Wang Shimao in anon. (1993a, p. 323).³⁰⁹ *Glycine max* (L.) Merr.³¹⁰ *Fei pu zhong wu* 非園中物.

he has seen, around twenty different varieties, referring his reader to already published treatises for practical advice about how to cultivate them. To sum up, he provides a text describing the tastes of this particular devotee of plants who possesses a garden and clearly spends a great deal of time in it. However, his intention is not to transmit cultivation techniques but rather to explain his aesthetic choices. One particular aspect of his work is one that we also find in other texts, namely a keen interest in problems connected with the adaptation of plants introduced from other regions.

Certain aspects of the work of Gao Lian 高濂 (dates unknown) are already familiar to readers of *Science and Civilisation in China*, for Joseph Needham on several occasions mentioned his contributions to knowledge about ornamental plants³¹¹ and also about gymnastic techniques.³¹² Gao Lian was a native of Qian Tang 錢塘, now Hangzhou, in Zhejiang. His personal name was Shenfu 深甫, his surname Rui Nan Daoren 瑞南道人. He was active in the early years of the reign of Shen Zong (1573–1619) and has left poems (*shi* 詩), plays for the theatre in the southern style, and poems for singing (*yue fu* 樂府). He also composed an important collection of notes, *Zun sheng ba jian* 遵生八箋 (Eight Disquisitions on the Art of Living (a Retired Life)) (1591), including writings on plants that form the third and last part of the fifth chapter, which is entitled *Yan xian qing shang jian* 燕閑清賞箋 (Pleasurable Occupations of a Life of Retirement). After three brief passages on bouquets, the *Si shi hua ji* 四時花紀 (Notes on the Flowers of the Four Seasons) describes 219 flowering plant species and varieties.³¹³ For each entry, a brief rubric supplies information about the colour of the petals and whether or not they are edible, the nature of the flowers when some of them are double, good ways of manuring them, advice on cutting and grafting, the right moment to divide plants, and, of course, aesthetic appreciation. Although this does not amount to a full treatise on gardening, it nevertheless constitutes a valuable little treatise for a knowledgeable enthusiast who is already familiar with the bases of the cultivation of plants. It is followed by a short chapter that comments on twenty-two trees and shrubs that can be cultivated in pots for the sake of the beauty of their fruit.³¹⁴ Five monographs on flowers and bamboos, *Hua zhu wu pu* 花竹五譜, make up the last part of these notes on the subject of plants. The first is devoted to peony shrubs, *mu dan*; the second to herbaceous peonies, *shao yao*; the third to chrysanthemums, *ju*; the next to orchids, *lan*, of the *Cymbidium* genus; and the last to bamboos, *zhu*. Although the author considers these texts to be incomplete and presents them as compilations of notes derived from his reading, for the benefit of ‘flower cultivators’, *yi hua zhe* 藝花者, who have retired to their

³¹¹ Cf. SCC Volume 6, Part 1, pp. 350, 361, 378, 392, 408, 409, 411, 415, 418.

³¹² Cf. SCC Volume 2, p. 145.

³¹³ Gao Lian (1988, pp. 571–99). To be precise, the text is composed of a list of 106 names, many of which have a generic meaning; this is confirmed by the fact that for thirty-eight of them various kinds of *zhong* are cited (ranging from two to ten), forming various groups, hence the total figure of 219 ‘species and varieties’.

³¹⁴ Gao Lian (1988, pp. 599–605).

mountain gardens, in truth they really are practical, if not exhaustive, little treatises. On tree peonies,³¹⁵ for example, we find paragraphs devoted, successively, to the harvesting of seeds, the conditions favourable to their cultivation, the preparation of the soil, the division of plants, grafting, watering, feeding, regular care and, finally, prohibitions. Next comes a list of 108 varieties classified in categories, *lei* 類, according to the colour of the flowers: yellow, *huang* 黃 (two); deep red, *da hong* 大紅 (eighteen); peach red, *tao hong* 桃紅 (twenty-nine); powdery red (pink), *fen hong* 粉紅 (twenty-two); purple, *zi* 紫 (seventeen); and white, *bai* 白 (twenty). For each of the varieties, a brief note of varying length indicates at least whether the flower is double, and, sometimes, also colour nuances, the size of the flower, the height of the plant, the hazards of flowering, petal details and lastly whether it is a variety that prefers the shade. In the case of herbaceous peonies, after a brief introduction based on ancient sources and three short paragraphs containing advice on cultivation – separation, manuring and pruning – only the names that appear in the three earlier treatises are repeated, in all 101 varieties.³¹⁶ The treatise on chrysanthemums also begins with advice on cultivation, the division of roots, the choice of earth and manure, the nipping of stems, providing light for the flowers, the destruction of pests, providing support for the plants, preventing rotting roots and, finally, grafting.³¹⁷ There then follows an impressive list of 185 names of varieties, but with no commentary. The names and descriptions of the characteristics of the twenty-two varieties particularly in demand make up the first part of the treatise on *Cymbidium*.³¹⁸ The four next paragraphs are devoted to reflections on the ways of making the most of these plants, taking care of them, preparing the soil for the pot in which they are to be placed and, finally, watering them correctly. In the last two parts, the author meticulously indicates what is suited to each of the varieties. More advice about cultivation is provided in the form of short texts presented under the title *Zhong lan ao jue* 種蘭奧訣 (Marvellous Precepts for the Cultivation of *Cymbidium*). This memorandum ends by noting four things to avoid in each season and twelve quatrains of seven-syllable verse that sum up the tasks to be done in each month of the year. The treatise on bamboos begins with a general introduction based on citations and followed by names, accompanied by brief commentaries on twenty-two species that the author particularly likes for aesthetic reasons. A reading of this last part of the *Pleasurable Occupations of a Life of Retirement* certainly conveys the importance of the relationship that Gao Lian enjoys with these carefully cultivated plants.³¹⁹ The notes convey every aspect of this relationship, the aesthetic ones, of course, but also dietary and medicinal ones. It furthermore certainly seems that, living in retirement, he was not content simply to read and write comments on his reading, but must also have taken a hand in cultivating his favourite plants.

³¹⁵ Gao Lian (1988, pp. 605–12).

³¹⁶ Gao Lian (1988, pp. 612–15).

³¹⁷ Gao Lian (1988, pp. 615–21).

³¹⁸ Gao Lian (1988, pp. 621–35).

³¹⁹ On the relations between various human groups and plants, see Goody (1993).

The *Jia pu ji* 稼圃輯 (Collection of Notes on the Cultivation of Gardens and Fields), author unknown, probably composed after the Jia Jing period (1522–66), is known only from a late manuscript copy that is preserved in the Shanghai Library and was edited in 1963 by Hu Daojing.³²⁰ It is made up of seven parts that are devoted, respectively, to varieties of rice, wheat, taros, hemp, vegetables, and fruits, *shui guo* 水果, and one chapter on techniques of the cultivation, transplantation and grafting of trees, which ends with rubrics devoted again to fruit, but this time to the fruits of trees, *mu guo* 木果. Those last three parts are the ones that I shall be considering here. The region that is involved is the lower valley of the Yangzi river.³²¹ The part devoted to vegetables is preceded by a brief introduction providing advice on the establishment of live hedges. After a list of thirty-eight names of vegetables and one of ten names of fruits, there is a passage on the days that are favourable for sowing vegetables. It should be noted that ‘fruit’ here has an ethnobotanical sense, for under the general title *shui guo* 水果, literally ‘water fruit’, we find not only actual fruits such as the water melon (*xi gua* 西瓜), the euryale (*ji dou* 雞豆 – for *ji tou* 雞頭), the water caltrop (*ling* 菱), the ‘heavenly aubergine’ (*tian qie* 天茄³²²) and the groundnut/peanut (*luo hua sheng* 落花生), but also other parts of plants such as the rhizome of lotus (*ou* 藕), the corm of a water chestnut (*pi ji* 荸薺) and of the arrowhead (*ci gu* 茨菇), and the stem of sugar cane (*gan zhe* 甘蔗). As for the vegetables, alongside those cultivated that have already been mentioned in works concerning the lower Yangzi region, we should note the appearance of new plants such as the Chinese pumpkin, *nan gua* 南瓜,³²³ mioga ginger, *rang he* 蕺菜,³²⁴ much used today in Japanese cooking; the water shield, *chun cai* 蕹菜,³²⁵ one of the vegetables typical of Hangzhou cooking; young shoots of mungo, *liu dou ya* 綠豆芽, and of soya (*huang ya cai* 黃芽菜); alfalfa, *mu xu* 苜蓿,³²⁶ bird rape, *you cai* 油菜 (the text notes that the seeds are a source of oil and the oil-cakes are a good fertiliser for the soil),³²⁷ water spinach, *weng cai* 甕菜,³²⁸ air potato, *huang du* 黃獨,³²⁹ and a yam, the aerial tubers of which are edible. The reappearance of mallow, *lu kui* 露葵,³³⁰ is also noted, as is that of *Perilla*, *ren* 荏,³³¹ and water pepper, *liao* 蓼. The last part, which is devoted to fruit trees, begins with a list of favourable and unfavourable days for a variety of activities; next comes a series of recommendations that ensure a good harvest. The text ends with rubrics of varying length that purvey basic

³²⁰ Dated Kangxi 26 (1687). ³²¹ Hu Daojing (1963) in the postface to the edition of the manuscript.

³²² The text describes this plant as climbing and producing fruit resembling small aubergines.

³²³ *Cucurbita moschata* Duch. ³²⁴ *Zingiber mioga* Rosc. ³²⁵ *Brasenia schreberi* J. F. Gmel. ³²⁶ *Medicago* sp.

³²⁷ *Brassica campestris* L. var. *oleifera* DC. ³²⁸ *Ipomea aquatica* Forsk.

³²⁹ *Dioscorea bulbifera* L. var. *sativa* Lindley (= *D. bulbifera* L.; *D. sativa* var. *elongata* (Bailey) Prain and Burkill; *D. bulbifera* L. forma *domestica* Makino and Nemoto) (Fèvre and Métaillé 2005, p. 200). Under the name *mukago* むかご, the small fruits of this yam (*kashū imo* かしういも) are an ingredient of Japanese cuisine that is much appreciated.

³³⁰ Synonym of *dong kui* 冬葵, *Malva verticillata* L. (= *M. crispa* L.) (Fèvre and Métaillé 2005, p. 107).

³³¹ *Perilla frutescens* (L.) Britt. (= *P. ocyroides* L. The leaf is consumed and the seeds provide an oil (Fèvre and Métaillé 2005, p. 18).

information about cultivating the following fruit trees: the peach tree (*tao* 桃), the apricot tree (*xing* 杏), the Japanese apricot tree (*mei* 梅), the plum tree (*li* 李), the loquat tree (*pi pa* 枇杷), the jujube tree (*zao* 棗), the pear tree (*li* 梨), the chestnut tree (*li* 栗), the kaki tree (*shi* 柿), the bayberry tree (*yang mei* 楊梅), the Orient crab-apple tree (*hua hong* 花紅³³²), the tangerine tree (*ju* 橘), the sweet orange tree (*cheng* 橙), the King orange tree (*gan* 柑), the shaddock tree, pummelo (*you* 柚),³³³ the citron tree (*xiang yuan* 香櫞),³³⁴ the thick-skinned citron tree (*zhu luan* 朱欖),³³⁵ the ginkgo tree (*yin xing* 銀杏), the hazelnut tree (*zhen* 榛),³³⁶ the pomegranate tree (*shi liu* 石榴), the cherry tree (*ying tao* 櫻桃), the vine (*pu tao* 葡萄), the apple tree (*ping guo* 蘋果), the litchi tree (*li zhi* 荔枝), the canary tree (*gan lan* 橄欖), the Chinese quince tree (*mu gua* 木瓜), the walnut tree (*hu tao* 胡桃), the metaplexis tree (*yang po nai* 羊婆奶),³³⁷ the magnolia tree (*mu lan* 木蘭)³³⁸ and the fig tree (*wu hua guo* 無花果). This text, too, shows the richness and variety of cultivation in the lower Yangzi region, with trees such as the litchi and the canary tree, which nowadays are to be found in more southern regions.

In a rather different genre, the *Guan yuan shi* 灌園史 (author's preface dated the forty-fourth year of the reign of Wan Li, 1616), by Chen Shijiao 陳詩教, combines historical anecdotes relating to exceptional plants with chapters that describe horticultural techniques. The author, whose personal name was Sike 四可 and surname was Lütian 綠天,³³⁹ was a native of Xiushui 秀水 in Zhejiang.³⁴⁰ As well as a preface, this work has two main parts, each subdivided in two, *qian* 前 and *hou* 後, 'former' and 'latter'. The first part, entitled 'Gu xian' 古獻 (Wisdom of the Ancients), takes the form of short paragraphs, each of which recalls an ancient historical fact that relates to a plant. This is reminiscent of the contents of another work by the same author, the *Hua li hua* 花里話 (Notes about Flowers), the preface of which is dated to the same year as that of the *Guan yuan shi*, and which consists of a compilation of anecdotes classified by dynasties and all relating to events connected with plants. The second part, 'Jin xing' 今刑

³³² *Malus asiatica* Nakai.

³³³ *Citrus maxima* (Burman) Merrill (Gao Minggan 2006) = *Citrus grandis* (L.) Osbeck = *Citrus pompelmos* Risso (Fèvre and Métaillé 2005, p. 552).

³³⁴ *Citrus medica* L. Another possible identification in this context is Ichang lemon, *Citrus wilsonii* Tanaka (= *C. grandis* (L.) Osbeck var. *shangyuan* Hu) (see Fèvre and Métaillé 2005, pp. 246 and 499).

³³⁵ The text explains that the fruit is particularly fragrant and mentions a process for extracting the perfume. It should be noted that for Li Shizhen (1975–81, Volume 3, p. 1794), *xiang yuan* 香櫞 and *zhu luan* 朱欖 designate two varieties of grapefruit tree that bear fruits that are larger than the *you* 柚. According to a note cited on p. 587 in the *You huan ji wen* 游宦紀聞 collection by Zhang Shinan 張世南, who had lived under the Song, this name could also designate *Poncirus trifoliata* (L.) Raf.

³³⁶ *Corylus heterophylla* Fisch. (Yu Dejun 1982, p. 258).

³³⁷ *Metaplexis japonica* (Thunb.) Mak.; anon. (1977b, Fig. 4116).

³³⁸ *Magnolia liliflora* Desr., synonym of *xin yi* 辛夷, in anon. (1977b, Fig. 2354).

³³⁹ According to the text of the edition in the Library of Congress, Washington (ref. G 354). Wang Yuhu (1979, p. 175) mentions Lüfu 綠夫.

³⁴⁰ Xiushui is to the north of Jiaying.

(A Present-Day Imitation), is devoted to horticulture. It begins with a calendar of flora in which a list of plant names is simply given for each of the twelve months of the year. Next, under the title 'Zong fa' 總法 (A Collection of Methods), the author lists what he considers to be the ten activities of a gardener. These are, respectively, sowing (*xia zhong* 下種), which may either be in rows or broadcast; propagation by cuttings (*fen cha* 分插); grafting (*jie huan* 接換); transplantation (*yi* 移); pruning (*xiu* 修); 'protection' (*bao hu* 保護), which discusses ways of protecting plants against intemperate weather or harmful influences, the smell of musc, for example; the stimulation of growth (*cui yang* 催養); the eradication of pests (*que chong* 却蟲); the preservation of soils (*zhu tu* 貯土); and finally watering (*shao guan* 澆灌). We should note that this passage was to be repeated *in toto* at the beginning of the Qing dynasty and edited under the title *Lao pu liang yan* 老圃良言 (Valuable Advice from Old Gardeners) by Chao Mincheng 巢鳴盛, who describes the text as a transcription of conversations between two old gardeners, his own village neighbours. The end of the second part is made up of a series of rubrics, each devoted to one plant and grouped under the following four titles: *hua hui* 花卉, '[plants with] flowers'; *zhu shu* 竹樹, 'bamboos and trees'; *gua guo* 瓜果, 'gourds and fruits'; *cha shu* 茶蔬, 'tea and vegetables'. The originality of this document, compared with the earlier works, is that in every case the text begins with a historical reference or a poem concerning the plant in question before the author goes on immediately, without a break, to provide technical details relating to its cultivation. Forty of the entries concern plants with flowers, seven concern trees and bamboos, twelve concern gourds and fruits and another twelve concern vegetables. Perhaps the relatively reduced number of plants confirms the complaint that the author makes in his preface to the *Hua li hua*, namely that, being confined to his home by illness, he had not been able to travel and so had to content himself with whatever his own garden could offer him to investigate.

The *Zhi pin* 植品 (An Appreciation of Plants) by Zhao Han 趙涵 was completed soon after the last-mentioned work and has an author's preface dated to the forty-fifth year of the reign of Wan Li (1617). The information that he provides in his preface suggests that he was born around 1570. Zhao Han, who was a native of Zhouzhi 鄒至 in the province of Shaanxi 陝西, had as his personal name, *zi*, Zihan 子函. He was *ju ren* 舉人, a graduate of examinations of the second degree. Living, as he did, close to the ancient capitals of the Han and Tang dynasties, he was passionately interested in ancient engraved inscriptions, the texts of which he collected; he also travelled extensively in numerous regions, visiting friends or else accompanying them.³⁴¹ We learn from his preface that he had loved and cultivated plants

³⁴¹ Fang Binguan et al. (1933, p. 1409).

ever since childhood. From his travels in southern regions, he had brought back to Shaanxi plants that he then set about cultivating. This text, a non-paginated manuscript copy of which may be found in the Beijing Library, consists of two *juan*. Fifty-five names of flowering plants, essentially herbaceous ones, make up the entries in the first *juan*, while trees that are interesting for their flowers, and fruit trees and vegetables, are the subject of the second *juan*. In all, nearly 150 kinds of plant are named. The interest of this text certainly lies in the diversity and richness of the information that it provides. It is presented as a kind of catalogue in which the entries are the names of plants, and it provides a mixture of notes on nomenclature, cultivation techniques, historical details – such as the arrival in China of the tomato and the sunflower in the course of the Wan Li period (1573–1620) – and also aesthetic remarks of appreciation. To a large extent, the text is based on the author's personal experience and his own reading. In the first rank of the authors that Zhao Han cites for comparative purposes we find Wang Shimou, whose *Xue pu za shu* has just been discussed above. The *Zhi pin* is a valuable record of the relations that a 17th-century Chinese scholar could maintain, in the widest sense, with plants. To cite but one example, here is what he has to say about the *Hemerocallis*, *xuan*:

xuan cao 護草, also called *xuan* 萱 and *wang you* 忘憂 [forget worry] – for eating them can make worries disappear – or *yi nan* 宜男 [predicting a boy] (if a woman wears one in her belt, this favours the arrival of male children). There are three kinds (*zhong* 種): with simple petals [single flower], with a thousand petals [double flower] and sweet-smelling. There are also two kinds of the plant with single flowers, one that flowers in the fourth month, the other that flowers in the fifth month and the sixth month. The one that flowers in the fourth month has thin leaves and small flowers of various colours; it is finer than the one that flowers in the fifth and six months. The fragrant *Hemerocallis* flowers in the seventh month; the people of Henan call it *jin zan* 金簪 [golden pin].³⁴² I cultivate it in a pot with a plantain lily and a begonia (*qiu hai tang* 秋海棠); they keep one another company; the colours and fragrances complement one another, increasing the splendours of autumn.

The *Changan wen hua ji* 長安問花記 (Notes on Visits to the Flowers of the Capital) takes the form of a list of 107 names of flowering plants.³⁴³ It was completed between 1613 and 1621.³⁴⁴ The author, Song Qiming 宋啟明, personal name, *zi*, Tianyun 天雲, was a native of Huating 華亭 in the region of present-day Shanghai. He is the author of various works, including a commentary on the *Lü shi chun qiu*. Little is known of his biography, but Ni Genjin deduces the dates of 1582 for his birth and during the Tian Qi 天啟 period (1621–7) for his death. These notes exist in the form

³⁴² *Zan* 簪, in its primary sense, designates hairpins or hatpins. *Yu zan* 玉簪, 'jade pin', is the name given to plantain lilies.

³⁴³ Wang Yuhu (1979, p. 207) and Ni Genjin (1996, p. 107) mention a total of 109.

³⁴⁴ Ni Genjin (1996, p. 107). All the autobiographical information that follows is borrowed from this author.

of twenty-one pages of a manuscript in a collection by Sun Ruoying 孫若英 entitled *Hua shi* 花史 (A History of Flowers), which is preserved in the Beijing Library. This text begins with a short preamble in which the author reminds the reader that flowers prosper in the regions with a temperate climate that stretch from south of the Yangzi all the way to Fujian and Guangdong, and so it is there that floriculture (*hua shi* 花事) is the most flourishing. In the north, however, the harsh climate prevents all the flowers from southern gardens prospering, so in order to enjoy them they must be cultivated in pots. As a result, only the most valuable ones are imported. He recalls the use, in the gardens of the Song emperors, of a procedure designed to force flowering using steaming water and also, under the Western Han, in the gardens of high-ranking officials, the cultivation of the Chinese onion (*cong* 蔥³⁴⁵) and the Chinese chive (*jiu* 韭³⁴⁶) which was effected, in winter, in covered galleries that were heated in the mornings and the evenings. Finally, he says that when he was unable to determine the species of a flower, he would consult the flower cultivators (*hua ren* 花人) of the town, which in this case was Beijing. The lists that follow are not strictly speaking a little treatise on horticulture. Rather, they make up a collection of brush-stroke jottings in which the author records both what he has seen and also the fruit of his reading. However, unlike other flower enthusiasts, he hardly ever records his own personal impressions. This text is more like a vade-mecum that provides information of a quite technical, philological or literary nature by means of many citations from poems relating to each of the plants that are named, but it does this in a quite random manner. For example, beginning with the Japanese apricot tree (*mei hua* 梅花), he describes what one should do in order for it to grow in the unfavourable conditions of the capital: grow it in a pot, in a sheltered place, in winter, and transplant it outdoors, into the earth, in the spring; then bring it back indoors as soon as the first frosts strike. Next he gives the names of a few varieties. In the case of the plum tree (*li* 李), he remarks that the flowers are larger than in the south. For the peach tree (*tao* 桃), he notes that there are some varieties of large tree with small flowers cultivated solely for their fruits; these are known as golden peaches, silver peaches or honey peaches. He also notes that the fruits harvested from ungrafted plants are inferior in taste to the fruits from grafted trees and that the very best come from trees that have been grafted three times over. Then he points out that trees cultivated for their flowers are always grown in pots and do not produce fruit and that the most beautiful are always those with double flowers. Here and there, a few particular customs are noted: the use of balsam leaves (*feng xian* 鳳仙³⁴⁷) for dyeing fingernails, the use of crushed spiderwort leaves (*dan zhu ye* 淡竹葉³⁴⁸) for making yeast (*qu* 麴) for an alcoholic drink (*zhu ye qing* 竹葉清), the use of roses (*mei gui* 玫瑰) that are distilled to make rosewater. The author

³⁴⁵ *Allium fistulosum* L. in Wu Gengmin (1957), Li Hui-Lin (1969).

³⁴⁶ Wu Gengmin (1957) gives the Latin binomial *Allium odorum* L. Li Hui-Lin (1969) calls it Chinese leek, *Allium ramosum* L. The modern identification should be *Allium tuberosum* Rottler ex Spreng.

³⁴⁷ *Impatiens balsamina* L.

³⁴⁸ Synonym of *ya zhi cao* 鴨跖草, *Commelina communis* L. See Gao Minggan (2006, p. 336).

also records an example of a belief that he describes as ‘popular’ (*su* 俗) about the influence of modes of sowing seeds upon the results of the sowing: in the case of the opium poppy, during the night in mid-autumn, seeds spread with a broom produce double flowers, whereas those distributed between clasped hands produce styles shaped like a column (*chong tai* 重臺). One point of interest in this collection of notes lies in what the author reports as peculiar to the plants grown in the capital, namely their vernacular names, tastes and customs. He certainly notes, in particular, the care taken by the *hua ren* 花人, ‘the flower-men’, in order to protect their plants in the winter, but he also mentions certain doubtful practices that have not escaped his notice, such as those stemming from rivalry between the gardeners (*yuan gong* 園工) where peonies are concerned: the withering of exceptional plants grown by a rival may be provoked by a jab in the stem inflicted by a cuttlefish (*wu zei yu* 烏賊魚) bone.

The *Hua shi zuo bian* 花史左編 (A Short History of Flowers) (preface dated the forty-sixth year of the reign of Wan Li (1618)) is another treatise on plants that is of a hybrid nature. Its author, Wang Lu 王路, personal name Zhongzun 仲遵, surname Danyun 澹雲, nickname (*zi hao*) Tai-yuan Shi an sheng 太原是岸生, was a native of Jiaying 嘉興, in present-day Zhejiang.³⁴⁹ Describing himself as ‘crazy about flowers’ (*hua pi* 花癖), he led a quiet retired life in a cottage that he had built himself in the mountains. Cultivating a garden and collecting from his extensive reading all the available information about plants, he composed a voluminous work in twenty-four *juan*, forming the same number of chapters, each of which was devoted to one particular subject. The first, entitled ‘Hua zhi pin’ 花之品 (An Appreciation of Flowers), concerns the classification of plants solely according to their beauty, which is judged as analogous to human beauty. The second chapter, ‘Hua zhi qi’ 花之奇 (Flower Peculiarities), comprises 100 rubrics. The third, ‘Hua zhi ming’ 花之名, as its name suggests, is devoted to the ‘Naming of Flowers’, and lists the names of 116 flowering plant species, in some cases accompanied by lists of varieties found in ancient texts (the most important of these being 111 varieties of shrub peony (*mu dan* 牡丹) from the point of view of the colours of their petals, 102 herbaceous peonies (*shao yao* 芍藥) and 168 chrysanthemums, to which another 163 are added in an attachment). The fourth, ‘Hua zhi bian’ 花之辨 (Identifications of Flowers), concerns cases of synonyms and homonyms. The fifth, ‘Hua zhi hou’ 花之候 (The Seasons of Flowers), which is devoted to the various relations between plants and time, starts with a calendar that notes for each month the activities recommended when dealing with species of plants in general; this is followed by short paragraphs on certain particular plants (chrysanthemums, peonies, *Cymbidiums* and so on). The sixth, ‘Hua zhi rui’ 花之瑞 (The Favours of Flowers), briefly relates a number of anecdotes about extraordinary manifestations on the part of around one dozen

³⁴⁹ Wang Yuhu (1979, p. 176) points out that the text has also been wrongly attributed to Chen Jiru 陳繼儒. We should, however, note that it was the latter author who revised and established, *shan ding* 刪定, the text of the *Guan yuan shi*.

plants. The seventh, 'Hua zhi yao' 花之妖 (The Strangenesses of Plants), is a catalogue of fifty anomalous cases of bizarre or mysterious facts linked to different plants. The eighth, 'Hua zhi yi' 花之宜, addresses 'what suits plants'. It provides various items of advice of a strictly horticultural nature but also an assortment of 'ploys' of purely aesthetic interest. This chapter ends with two texts about the art of bouquets. The ninth, 'Hua zhi qing' 花之情 (The Feelings of Flowers), relates fourteen cases of plant reactions to manifestations of feeling on the part of human beings. In the tenth chapter, 'Hua zhi wei' 花之味 (The Taste of Flowers), the author relates thirty-eight anecdotes relating to the effects of beverages made using flowers. The eleventh, 'Hua zhi rong' 花之榮 (The Glory of Flowers), relates historical episodes in which flowers behave in an admirable fashion. The twelfth chapter, 'Hua zhi ru' 花之辱 (The Shame of Flowers), contains more historical anecdotes that suggest to the author a negative attitude on the part of certain plants. The thirteenth chapter, 'Hua zhi ji' 花之忌 (Prohibitions for Flowers), notes what one should avoid doing when cultivating flowers. Here the author writes in a direct style and makes no historical references. The fourteenth, 'Hua zhi yun' 花之運 (The Fortune of Flowers), describes favourable omens and other signs of good luck revealed by certain flowers. The fifteenth, 'Hua zhi meng' 花之夢 (Dreams of Flowers), consists of a series of citations from famous authors on the subject of the appearances of flowers in dreams. The sixteenth, 'Hua zhi shi' 花之事 (Facts [relating to] Flowers), is also made up of a succession of historical anecdotes about a variety of subjects, such as the two following examples: 'In a treatise on flowers, one Tang author declares that the *mu dan* [peony] is the *shao yao* [peony] in the form of a tree'; 'In the course of a banquet [the Tang emperor] Ming Huang, sitting under a peach tree, said, "if the *Hemerocallis* makes sadness pass, this flower, for its part, eliminates regret"'. The seventeenth, 'Hua zhi ren' 花之人 (Men of Flowers), cites cases of passion felt for flowers either in the process of cultivating them, protecting them or even simply admiring them. The eighteenth, 'Hua zhi zheng' 花之證 (Information about Flowers), is composed of literary citations that make it possible to explain the meaning of various flower names. The nineteenth, 'Hua zhi du' 花之妒 (Jealous Detestation of Flowers), tells of many occasions when flowers brought upon themselves aggression on the part either of human beings or of natural elements such as the wind. The twentieth, 'Hua zhi wu' 花之兀 (The Punishment of Flowers), records historical anecdotes in which flowers have been destroyed for having disturbed the grief or worries of great personages by their blooming. The twenty-first, 'Hua zhi yao' 花之藥 (Flower Medicaments), lists, without many details, thirty or so plants that can be used as medicaments. The twenty-second, 'Hua zhi du' 花之毒 (Flower Poisons), cites ten cases of poisonous plants. The twenty-third, 'Hua zhi si' 花之似 (Resemblances of Flowers), presents three categories of plants, 'with herbaceous stems' (*cao ben* 草本), 'with woody stems' (*mu ben* 木本) and 'with liana-like stems' (*teng ben* 藤本), the flowers of which resemble one another. Next comes a list of things that resemble flowers, such as snowflakes, followed by five culinary recipes the names of which include the

morpheme *hua*, 'flower'. The twenty-fourth and last chapter, 'Hua zhi bian' 花之變 (Flower Mutations), contains rubrics devoted to things that are not flowers but have been given the names of flowers. In this whole work, only parts of four chapters can be considered to refer to horticulture. The fourth, 'Hua zhi bian' (Identifications of Flowers), provides morphological details that the author considers to be relevant for the differentiation and naming of various varieties. The fifth, 'Hua zhi hou' (The Seasons of Flowers), contains first a general agricultural calendar, then monthly prescriptions (*yue ling* 月令) concerning the cultivation of chrysanthemums, followed by various comments on the subject of forty-four flowering plants, some herbaceous, others shrubs. The eighth, 'Hua zhi yi' ([What Is] Suitable for Flowers), indicates particular techniques that suit various plants: when to sow them or take cuttings from them, when to transplant them, how to obtain more beautiful blooms, how to protect them from the winter weather, and so on. The thirteenth chapter, 'Hua zhi ji' (Prohibitions for Flowers), essentially contains warnings about watering and the spreading of manure. To sum up, this *Little History* is mostly a compilation of a variety of anecdotes interspersed with a few passages of horticultural interest.

The next book is quite different. The *Runan pu shi* 汝南圃史 (A History of the Gardens of Runan)³⁵⁰ was composed by Zhou Wenhua 周文華, personal name Hanzhang 含章, surname Guanglu 光祿, a native of Suzhou, who is best known as a plant enthusiast. Under the Ming, Runan did not appear as the name of any particular place. The authors of the *Si ku quan shu zong mu* consider that the contents of the book relate to Jiangnan, the lower valley of the Yangzi.³⁵¹ The book has three prefaces. The first, written by the author, is dated the last year of the reign of Wan Li (1620); the second is signed Wang Yuanmao 王元懋, the third is by Chen Yuansu 陳元素. In his preface,³⁵² Zhou Wenhua writes that he has composed his book in order to complete an unknown *Hua shi* 花史 (History of Flowers) by a certain Zhou Yunzhai 周允齋, also unknown both to the editors of the *Si ku quan shu zong mu*³⁵³ and to Wang Yuhu.³⁵⁴ As for the text, the *Ru nan pu shi* is divided into twelve parts, each of which corresponds to one *juan*. Information of a technical nature is presented in a very systematic way, particularly in the first two parts. The first *juan*, entitled 'Yue ling' 月令 (Monthly Ordinances), provides a calendar of all the operations to be carried out in a garden, month by month. Furthermore, a short preamble picks out the basic activities for the current month. For the first month, for example, we find,

³⁵⁰ Another title is mentioned at the head of each of the chapters of the *Zhi fu quan shu* 致富全書 (Complete Book for Achieving Opulence).

³⁵¹ Yong Rong et al. (1965, p. 1004).

³⁵² I have consulted two manuscript texts, that of the Beijing Library and that of the Kyō-u sho-oku 杏雨書屋 Library of the Takeda Scientific Foundation, in Osaka. Wang Yuhu points out that other rare editions do exist, all dating from the Wan Li period, and that only one has a preface by Wang Yuanmao. That preface is to be found in the Osaka manuscript but not in the Beijing one.

³⁵³ Yong Rong (1965, p. 1004).

³⁵⁴ Wang Yuhu (1979, pp. 178–9).

If, on the first day, when the cock crows, one burns what lies beneath the fruit trees, there will be no calamities owing to pests. If, early in the morning, one strikes the trees regularly with an axe, when the fruit is forming none of the fruit will fall; this is known as 'marrying the tree' (*jia shu* 嫁樹). This month is the most important time for the cultivation of trees. If one places bricks or stones in the forks of plum trees (*li shu* 李樹), the harvest of fruits will be more abundant. If one takes care of the trees during the first half of the month, the fruits will be more numerous. Avoid the days when there is a south wind. It is good to get rid of all the various branches that start to grow at the base of fruit trees.

Next, still for each month, the names of all the plants involved are listed under the title of one of the various operations that have to be carried out during the current month. The rest of this chapter is entirely devoted to setting out meteorological and harvest predictions, taking into consideration numerous factors, such as the weather on particular days, the aspect of certain parts of the plants (the first bud, the first ear of grain etc.). A systematic presentation of the predictions for each month follows general considerations; for example:

If, in the morning of the first day in the year, black clouds appear before sunrise, in the east, the spring will be rainy; in the south, there will be heavy rains in the summer; in the same way, the west governs the autumn, as does the north the winter.

The second chapter, which is entitled 'Zai zhong shi er fa' 栽種十二法 (The Twelve Cultivation Methods), is a collection of forty-six citations extracted from the seven following texts, to which the author explicitly refers: the *Hua pu* 花譜 (Treatise on Flowers)³⁵⁵ by Zhou Yunzhai (nineteen occurrences), the *Guan yuan shi* (1616) by Chen Shijiao (ten citations), the [*Fen men*] *Suo sui lu* 分門鎖碎錄 (c.1127) by Wen Ge (nine citations), the *Jia pu qi shu* 稼圃奇書 (Marvellous Book of Fields and Gardens) (four citations). The other three texts are each mentioned only once; they are the *Nong sang cuo yao* 農桑撮要 (1330) by Lu Mingshan 魯明善, *Gui xin za shi* 癸辛雜識 (Miscellany of Gui Xin (a street in Hangzhou)) by Zhou Mi 周密 (1232–98) and the *Wang shi ri chao* 王氏日抄 (Journal of Mr Wang). The twelve activities are mentioned in the following order: sowing (*xia zhong* 下種), division of seedlings (*fen zai* 分栽), making cuttings (*qian cha* 扦插), grafting (*jie huan* 接換), layering (*ya tiao* 壓條), approach grafting (*guo tie* 過貼), transplantation (*yi zhi* 移植), tending (*zheng dun* 整頓), watering (*jiao guan* 澆灌), mulching (*pei yong* 培壅), harvesting (*zhai shi* 摘實) and selection of seeds (*shou zhong* 收種).

Following this description of what it is fundamental to do in a garden, all the remaining ten chapters contain short monographs on various types of cultivation. These are arranged as follows:

Juan 3, section on '[trees with] fruits [and] flowers' (*hua guo* 花果³⁵⁶): Japanese apricot tree (*mei*), apricot tree (*xing*), peach tree (*tao*), plum tree (*li*), Japanese plum tree (*yu li*), pomegranate tree (*shi liu*), cherry tree (*ying tao*).

³⁵⁵ We should note that in the preface this treatise is called *Hua shi* (History of Flowers).

³⁵⁶ The title of this category should be understood as 'trees that produce flowers and fruits'. Although the distinction between this category and the following one underlines the importance attached to blooms in the

Juan 4, section on 'fruits from trees' (*mu guo* 木果): loquat (*pi pa*), Chinese bayberry (*yang mei*), apple (*nai*), hazelnut (*zhen*), grape (*pu tao*), ginkgo (*yin xing*), jujube (*zao*), chestnut (*li*), nut (*hu tao*), persimmon (*shi*), tangerine (*ju*) and pummelo (*you*), sweet orange (*cheng*) and medicinal lemon (*xiang yuan*).

Juan 5, section on water fruits (*shui guo*): lotus (*he*), spikesedge (*ji*), gorgon plant, euryale (*qian*), sugar cane (*zhe*), water melon (*xi gua*), singhara nut (*bi ji*), arrowhead (*ci gu*).

Juan 6, section on the flowers of ligneous plants (*mu ben hua* 木本花), part 1: camellia (*shan cha* 山茶), fragrant daphne (*rui xiang* 瑞香), Chinese redbud (*zi jing* 紫荊), *Spirea* (*zhen zhu* 珍珠), magnolia (*yu lan* 玉蘭), magnolia (*xin yi* 辛夷), tree peony (*mu dan* 牡丹), peony (*shao yao* 芍藥), rhododendron (*du juan* 杜鵑).

Juan 7, section on the flowers of ligneous plants (*mu ben hua*) part 2: crabapple (*hai tang* 海棠), Chinese flowering quince (*mu gua* 木瓜), rugose rose (*mei gui* 玫瑰), sweetleaf (*shan fan* 山礬), Chinese snowball tree (*xiu qiu* 繡毬), Cape jasmine (*zhi zi* 梔子), Arabian jasmine (*mo li* 茉莉), sweet-scented oleander (*jia zhu tao* 夾竹桃), 'flower of the two solstices' (*er zhi hua* 二至花),³⁵⁷ Chinese St John's wort (*jin si tao* 金絲桃), crape myrtle (*wei hua* 薇花), sweet osmanthus (*gui hua* 桂花), cotton rose hibiscus (*fu rong* 芙蓉), wintersweet (*la mei* 臘梅), heavenly bamboo (*tian zhu* 天竹), *Damnacanthus* (*hu ci* 虎刺).

Juan 8, section on the flowers of thorny plants (*tiao ci hua* 條刺花): winter jasmine (*ying chun* 迎春), Chinese peashrub (*jin que hua* 金雀花), Japanese rose (*di tang* 棣棠), rose (*qiang wei* 薔薇), white rose (*fo jian xiao* 佛見笑), climbing rose (*jin sha* 金沙), Chinese rose (*yue ji* 月季), seven sisters Japanese rose (*shi zi mei* 十姊妹), briar rose (*tu mi* 酴醾), Banks rose (*mu xiang* 木香), *Weigela* (*jin dai* 錦帶), rose of Sharon (*mu jin* 木槿).

Juan 9, section on the flowers of herbaceous plants (*Cao ben hua* 草本花), part 1: *Cymbidium* orchid (*lan* 蘭), chrysanthemum (*ju* 菊), narcissus (*shui xian* 水仙).

Juan 10, section on the flowers of herbaceous plants, part 2: opium poppy (*ying su* 罌粟), corn poppy (*li chun* 麗春), mallow (*kui* 葵), hollyhock (*shu kui* 蜀葵), manihot (*qiu kui* 秋葵), lily (*bai he* 百合), common orange daylily (*xuan cao* 萱草), Chinese pink (*shi zhu* 石竹), lilac pink (*luo yang hua* 洛陽花), mullein pink (*jian chun luo* 剪春羅), garden balsam (*feng xian* 鳳仙), fragrant plantain lily (*bai e* 白萼), blackberry lily (*jia die hua* 蛺蝶花), sickle pod (*jue ming* 決明), yellowhead (*jin qian* 金錢), begonia (*qiu hai tang* 秋海棠), amaranth (*yan lai hong* 雁來紅 and *shi yang jin* 十樣錦), common cockscomb (*ji guan* 雞冠), *Alocasia* (*guan yin lian* 觀音蓮), Japanese anemone (*qiu mu dan* 秋牡丹), Chinese inula (*di di jin* 滴滴金), pot marigold (*jin zhan* 金盞), creeping rockfoil (*hu er* 虎耳), *Chloranthus* sp. (*shan hu* 珊瑚), golden lycoris (*jin deng* 金燈), passion flower (*xi fan lian* 西番蓮).

gardens, the next categories also emphasise the importance of the production of fruits. On the economic importance of ornamental gardens in China under the Ming, in the region of the lower Yangzi, see Craig Clunas (1996). See also Bray and Métaillé (2001, pp. 347–8).

³⁵⁷ Not identified.

Juan 11, part 1, section on trees and bamboos: bamboos (*zhu* 竹), pine (*song* 松), arborvitae (*bai* 柏), *Cunninghamia* (*shan* 杉), *Sophora*/Chinese scholar tree (*huai* 槐), elm (*yu* 榆), Chinese parasol (*wu tong* 梧桐), willow (*yang liu* 楊柳), tamarisk (*xi he liu* 西河柳), Chinese mahogany (*chun* 椿), privet (*dong qing* 冬青), *Photinia* (*shi nan* 石楠).

Juan 11, part 2, grasses (*cao* 草) section: sweet flag (*chang pu* 菖蒲); Japanese banana (*ba jiao* 芭蕉); antenoron (*jin xian cao* 金線草); *Selaginella* (*cui yun cao* 翠雲草); climbing fig (*bi li* 薜荔); omoto Nippon lily (*wan nian qing* 萬年青); reineckia (*ji xiang cao* 吉祥曹); mosses, lichens and liverworts (*tai* 苔); lesser duckweed (*ping* 萍).

Juan 12, part 1, vegetables (*shu cai* 蔬菜) section: Chinese wolfberry (*gou qi* 枸杞), sweet chrysanthemum (*gan ju* 甘菊), *Acanthopanax* (*wu jia pi* 五加皮), prickly ash (*jiao* 椒), asparagus lettuce or celtuce (*wo ju* 萵苣), wild rice stem (*jiao bai* 茭白), eggplant/aubergine (*qie* 茄), Chinese radish (*luo bo* 蘿蔔), carrot (*hu luo bo* 胡蘿蔔), taro (*yu* 芋), yam (*shan yao* 山藥), yam bulbils (*xiang yu* 香蓀), peanut (*luo hua sheng* 羅花生), beefsteak plant (*zi su* 紫蘇), mint (*bo he* 薄荷), ginger (*jiang* 薑), Chinese chive (*jiu* 韭), rakkyo (*xie* 薤), Chinese onion (*cong* 蔥), garlic (*suan* 蒜), leaf vegetables (*cai* 菜 – Chinese cabbage (*bai cai* 白菜), mallow (*kui* 葵), broad-beaked mustard (*ta cai* 蹋菜)), mustard (*jie* 芥), *Amaranthus* (*xian* 莧), purslane (*ma chi xian* 馬齒莧), spinach (*bo leng cai* 菠薐菜), celery (*qin* 芹).

Juan 12, part 2, gourds and pulses (*gua dou* 瓜豆) section: *Trichosanthes* (*wang gua* 王瓜), snake melon (*sheng gua* 生瓜), musk melon (*tian gua* 甜瓜), loofah (*si gua* 絲瓜), wax gourd (*dong gua* 冬瓜), Chinese pumpkin (*nan gua* 南瓜), squash (*bei gua* 北瓜), calabash (*hu* 瓠), broad bean (*can dou* 蠶豆), sweet pea (*wan dou* 豌豆), soya (*mao dou* 毛豆), cowpea (*jiang dou* 豇豆), sword bean (*dao dou* 刀豆), hyacinth bean (*bian dou* 扁豆).

This list contains the names of more than 200 plant kinds, most of which designate botanic species, some of which possess many cultivars, such as peony shrubs, the *Cymbidiums* and the chrysanthemums. We thus have a fairly precise picture of all the plants, particularly the ornamental ones that must have been liked and cultivated in the gardens of the lower Yangzi during the Ming dynasty. The fact that most of the plants cited are still to be found today in the flora of the gardens³⁵⁸ of this region testifies to the value of Zhou Wenhua's labours and the interest in his work. The particular feature of this text is the content of the monographs that are devoted to each of the plants. The strictly horticultural technical information is brief but precise and specific. Essentially it covers propagation by seeding, division or grafting. However, most of the texts repeat what is to be found in the *Ben cao gang mu* (1596). First we find etymological and philological remarks, then historical details, such as the periods when foreign plants were introduced, notes on the qualities of the various cultivars, the particular features of certain plants, and so

³⁵⁸ A consultation of the fine book by Peter Valder (1999) is extremely illuminating in this respect.

on. The citations from other texts – local monographs, notes made by literati, poems, encyclopaedias – all clearly indicated, are extremely numerous, whereas those relating to horticultural literature, which are essential in the initial technical chapters, are few and far between. Another detail worth noting is the relationship between the length of the rubrics and the cultural importance of the plants. Each comment is generally three or four pages long and contains around 170 characters, but the part devoted to orchids of the *Cymbidium* (*lan*) genus, to shrub peonies (*mu dan*) and to chrysanthemums (*ju*) occupies twenty-five pages; the lotus is described in nine pages; and the gardenia and Cape jasmine in only one and a half pages. Another point worth noting is that the text of these monographs does not consist solely of a succession of citations. In fact, some of the passages contain no references to other works and their content proves that they are notes made by the author himself. For instance, in a passage on a flowering apple tree, *hai tang*,³⁵⁹ just after two citations about the choice of grafting stock, we find the words ‘but I have not myself tried it’. Reading other similar citations, we get the feeling that when the author composed his work, he was concerned to compare his sources with his own experiences. A translation of two passages, one concerning the sweetleaf³⁶⁰ (*shan fan*) and another about the walnut tree, will give a better idea of how he operates:

Shan fan 山樊. Its leaves resemble those of the privet (*dong qing* 冬青).³⁶¹ It flowers during the third and the fourth months. The flowers are small but fragrant, with four petals.³⁶² It is also called *qi li xiang* 七里香³⁶³ [‘fragrance over seven *li*’] or *zheng hua* 鄭花 [‘flower of Zheng’], after the name of an ancient principality in the Spring and Autumn period, situated in what is now Henan. The people of the north call it *yang hua* 楊花 [flower of the *yang*], for it is as white as jade (*yang* 楊). In the preface to the poem by Huang Luzhi 黃魯直,³⁶⁴ one reads ‘Shan fan hua’ 山簪花 [‘Flower of the Sweetleaf’], ‘In the wild regions of the South, there is a kind of small white flower, a few feet tall. In the spring, its bloom is extremely fragrant. The wild southerners call it ‘the flower of Zheng’. Wang Jinggong 王荊公 wanted to write a poem but unfortunately changed its name to ‘mountain alum’ (*shan fan*). The reason for this name stems from the fact that the wild locals collect the leaves of this plant in order to [make] a yellow dye and they obtain the colour without using alum ... It can be divided during the second month.

Now here is part of what is written under the entry *hu tao* 胡桃 (walnut tree):

Hu tao 胡桃 [peach of the Hu].³⁶⁵ Synonyms *he tao* 核桃 [peach-stone], *jiang tao* 羌桃 [peach of the Jiang].³⁶⁶ It is said in the *Bo wu zhi* 博物志 [by Zhang Hua 張華] that Zhang Qian 張騫 was sent as an ambassador to the Territories of the West and brought a walnut tree back with him. The fruit is round and as green as [the kernel of] the ginkgo. You peel it and find the nut. Inside there is white flesh that is enclosed in a yellow membrane. There are big ones

³⁵⁹ *Malus spectabilis* (Ait.) Borkh. ³⁶⁰ *Symplocos caudata* Wall. ³⁶¹ *Ligustrum lucidum* Ait.

³⁶² In truth, the plants of the Symplocaceae family have five-petal flowers. Li Shizhen (1975–81, p. 2106) indicates that the plant that bears the same name has flowers with ‘six petals like [flakes of] snow’.

³⁶³ One *li* is the equivalent of approximately half a kilometre. ³⁶⁴ Huang Tingjian 黃庭堅 (1050–1110).

³⁶⁵ *Hu* designates the non-Chinese people living to the west of China.

³⁶⁶ *Jiang* designates the Tibetan tribes who lived to the west of present-day China. They were part of the *Wu Hu*, the ‘Five Hu’.

and small ones with flesh that is sometimes sticky, sometimes not.³⁶⁷ It is tender and has a delicious taste close to that of a hazelnut. It really is an excellent fruit. The *Tu jing ben cao*³⁶⁷ says, 'Walnut trees grow in the North. Nowadays they are numerous in between the Chan and the Luo rivers. Wide trunk and thick leaves. [Give] lots of shade. The fruits form clusters. They are picked in the autumn and the winter when they are ripe. They are of a hot nature and cannot be eaten many at a time. At first Zhang Qian planted it in the principality of Qin.³⁶⁸ Later, the tree progressively spread toward the lands in the east.' It is said in the *Ben cao* [*gang mu*] that 'the nut has a sweet taste, is neutral and is not poisonous. Eating it makes people fat and healthy, with smooth muscles and black hair. Consumed to excess, it is diuretic'.³⁶⁹ The dark green skin [the cortex of the fruit] dyes moustaches and silk black. The bark of the tree may dye things brown. If one notches the bark of the tree in the spring and one washes one's head with the liquid that comes out, one's hair becomes black ... The trees grow to between three and five *zhang* 丈 [ten to sixteen metres] high. Once sown, the seeds may germinate after a few years. In the *Shui yun lu* 水雲錄 [by Yang Pu 楊溥] it is written that 'if one wishes to sow walnut trees successfully, the walnuts must be buried horizontally. If the opening or the pointed side is on the top, the water seeps in and the rotted kernel does not develop. To graft, use wild walnuts trees of the same colour'.

Other remarks, too, reveal the author's sense of observation and the practices that he adopts. He notes, for example, that in the case of the gardenia, while the plants with single flowers produce fruits that can be used as a dye, those with double flowers are sterile. He notices that peach trees with double flowers produce only a few fruits.

If one takes into consideration the structure of the book, the number of plants cited, the proportions of technical passages and literary citations and the appositeness of the remarks on horticulture, one has to recognise that the author was an erudite scholar who knew a great deal about plants. He does cite a large number of extracts from literary texts but he clearly knows very well what goes on in a garden. The *Ru nan pu shi* is certainly a treatise on horticulture but this is a profoundly cultural kind of horticulture. Zhou Wenhua, while teaching how to cultivate plants, at the same time wished to share his aesthetic tastes where plants were concerned and to do this turned for support to what others before him had written. It seems that the text circulated widely in manuscript form and was certainly very influential in both China and Japan.

The encyclopaedic nature of the *Er ru ting qun fang pu* 二如亭群芳譜 led me earlier to introduce it briefly among the general treatises relating to plants.³⁷⁰ Just to recap, the personal name, *zi*, of its author, Wang Xiangjin 王象晉 (+1561 to +1653) was Jinchen 藎臣, his surname, *hao*, was Kang Yu 康宇 and his nickname, *zi hao*, was Hao Sheng Ju Shi 號生居士. He was a native of Xincheng 新城, now Huantai 桓台, in the province of Shandong. He became *jin shi* in 1604 but his career was hampered by his disgust of flattery. High dignitaries at Court held him at a distance

³⁶⁷ Compiled under the direction of Su Song 蘇頌, completed in 1061.

³⁶⁸ This was in the present-day provinces of Shanxi and Gansu. ³⁶⁹ See Li Shizhen (1975–81, p. 1804).

³⁷⁰ See above, pp. 25–9.

and eventually, although he did occupy a few posts as a minor official in the capital, he spent most of his time in his home town.³⁷¹ His preface tells us that there he owned a property of a hundred or so *mu* (about fifteen hectares) of low-grade fields that provided him with a modest lifestyle. He also had a garden which delighted him, in the middle of which was a small shelter called 'Er ru ting', hence the title of his book. He cultivated vegetables of several dozen kinds, and several dozen trees – pines, jujube trees and apricot trees – as well as bamboos. He also encouraged wild plants for, as he remarked in his book, 'plants do not need to be strange or exceptional to be worth cultivating'. As well as plants, he sought out specialised books in which he searched for answers to the problems that arose as he took care of his beds of plants. His book is based on his ten years of gardening experience. The date of the postface to his book is the first year of the Tian Qi reign (1621). As for its publication, Bretschneider claims that it took place in 1630,³⁷² but Hummel mentions an earlier edition dated between 1621 and 1628 and a second in around 1630 published by Mao Jin 毛晉 (1599–1659).³⁷³ The edition that I have used, kept in the library of the Needham Research Institute in Cambridge, is also dated 1630. The text was 'put in order', *quan ci* 詮次, by the author's son, Wang Yuling 王與齡, and grandson, Wang Shizhan 王士瞻, after it had been revised by Chen Jiru 陳繼儒, Mao Fengbao 毛鳳苞 and Yao Yuantai 姚元台. As I have already mentioned, the first of those revisers had also worked on the edition of the *Guan yuan shi*. Depending on the editions, the text is presented in either twenty-eight or thirty *juan*, but the content is exactly the same.³⁷⁴ It is divided into four major parts. The first, 'Yuan bu' 元部, 'Initial Section', offers general thoughts about the Heaven, the calendar, the Five Phases, and prognostics based on the state of the meteorology on certain days. The sections that are specifically devoted to horticulture are the following three: 'Heng bu' 亨部, which contains three treatises on vegetables and four on fruits, which follow on after one that is devoted to grains; 'Li bu' 利部, which comprises a treatise on tea and bamboos, one on textile plants (*sang*, the mulberry tree; *ma*, hemp; *ge*, *Pueraria*;³⁷⁵ and *mian*, cotton), three devoted to medicinal plants and two devoted to trees; and 'Zhen bu' 貞部, with four treatises on flowers and two on grasses (*hui* 卉). Wang Xiangjin justifies this classification in a 'little preface to the treatise on Heaven':

I write about all kinds of plants, I write about the grains because they feed us; I write about the vegetables, fruits and tea as these complement the grains; I write about trees and cotton, the mulberry tree, hemp, the *Pueraria* for these provide clothing and protection; I write about herbal remedies, trees and bamboos, for they are useful; and I write about flowers and grasses that are close to us.³⁷⁶

Compared to the earlier works that we have considered, this one stands out by reason of its size and the number of its entries: in total some 430 plant names are

³⁷¹ See Fan Chuyu (1994, Volume 3, p. 1).

³⁷² Bretschneider (1881, p. 70).

³⁷³ Hummel (1944, Volume 2, p. 821).

³⁷⁴ Wang Yuhu (1979, pp. 179–80).

³⁷⁵ The fibres are used to make 'Canton silk'.

³⁷⁶ Wang Xiangjin (1994, p. 22).

cited as entries and for each of them it first gives any synonyms and a description of the plant; next, a number of separate paragraphs are devoted respectively to cultivation techniques (*zhong zhi* 種植 and *xiu zhi* 修治), the uses and preparation of edible plants (*zhi yong* 製用), therapeutic advice and medicinal recipes (*liao zhi* 療治), extracts from literary texts in prose (*dian gu* 典故), 'literary and historical allusions', and finally poems, which are arranged under the title *li zao* 麗藻 ('fine poems'). This collection of notes relating to plants is divided into ten successive 'sections' (*bu* 部) for grains (*gu* 穀), vegetables (*shu* 蔬), fruits (*guo* 果), tea (*cha* 茶), bamboos (*zhu* 竹), the mulberry tree (*sang* 桑), medicinal plants (*yao* 藥), trees (*mu* 木), flowers (*hua* 花) and 'grasses' (*hui* 卉). Each section is introduced by a 'little preface' (*xiao xu* 小序) and other paragraphs that are devoted, successively, to various cultivation techniques and ways of protecting plants, and also to the harvesting, preservation and preparation of products. The cultivation of grains takes place outside gardens and is explained in the nine other sections that will be briefly discussed here. The two *juan* that follow the grains section list sixty-four kinds of vegetable, under three rubrics: *xin xun* 辛薰, spicy-aromatic; *rou hua* 柔滑, tender-mucilaginous; and *qing liang* 清涼, refreshing. Four *juan* are then devoted to fruits that are subdivided into four groups: *fu guo* 膚果, fruits with skins; *ke guo* 殼果, fruits with shells; *luo guo* 蓏果, the fruits of grasses or gourd-fruits; and *ze guo* 澤果, fruits of humid places – in all, seventy-seven cited plants. Two other *juan* are devoted respectively to tea and to bamboos; thirty names of species of bamboo that do not constitute specific entries are cited. The next *juan* concerns six plants that are useful for textiles by reason of their fibres, such as ramie, *zhu ma* 苧麻; hemp, *da ma* 大麻; abutilon, *tong ma* 苘麻; *Pueraria*, *ge* 葛; and cotton, *mian* 棉, or their use, such as the mulberry tree, *sang* 桑, the leaves of which serve to feed silkworms. These plants are presented in two chapters, cotton being the subject of a separate treatise. Medicinal plants are the subject of the next three chapters, in which sixty-nine different kinds are cited. Next comes information about thirty-nine trees. Flowers – eighty-three of them – are the subject of four *juan* and are divided into three categories: *mu ben* 木本, with a ligneous stem; *teng ben* 藤本, with a climbing stem; and *cao ben* 草本, with a herbaceous stem. Fifty-seven kinds of herbaceous plant (*hui* 卉) occupy the last but two chapters. Much of the text consists of literary citations or ones of a historical nature. The strictly horticultural information is divided up in various ways. Some is to be found at the top of each of the sections where a general presentation is offered, whereas the cultivation of individual plants is described in the rubric concerning the plant in question. The fact that these texts contain few bibliographical references suggests that they are based on personal experience. The text also constitutes a collection of medicinal recipes. Nevertheless, it does seem, as Wang Yuhu points out, that the *Qun fang pu* was originally conceived in the mind of its author as a work of an encyclopaedic nature on the subject of useful plants.³⁷⁷

³⁷⁷ Wang Yuhu (1979, p. 180).

Strictly speaking, then, this is not a horticultural treatise since it contains many references to wild plants and, furthermore, literary passages definitely outnumber those devoted to the cultivation of plants. Besides, it was its encyclopaedic character that was mainly noticed and that was famously further developed in the *Guang qun fang pu*.³⁷⁸

The *Guan yuan cao mu shi* 灌園草木識 (Knowledge about Garden Plants) (author's preface dated 1634) is very different from the last work. It is presented as a collection of information about some 264 varieties of plants of horticultural interest. The author, Chen Zhengxue 陳正學 (personal name, *zì*, Zhenxuan 貞鉉) was a native of Zhangzhou in the province of Fujian, where he owned a garden that he tended for thirty years.³⁷⁹ The book is composed of six parts, each of which corresponds to a *juan*. The first *juan* is devoted to 'the genus of flowers', *hua zhī shù* 花之屬, and contains 130 entries. The second, 'the genus of fruits', contains forty-eight entries; the third introduces the names of twenty-five kinds of tree but gives details about only eight of them; the fourth lists the names of thirty-six kinds of herbal medicine, fifteen of which are simply cited; while among the twenty-five kinds of vegetable listed in the fifth, information is provided for no more than half of them. As for the last *juan*, entitled 'Various Authors', 'Za zhu' 雜著, it cites no specific plants but does record texts relating to gardens. The names of plants that constitute entries frequently designate varieties of fruit, flower or vegetable. The contents of the short texts that correspond to each of the entries vary considerably. Mostly they consist of a brief description of the characteristics of the part of the plant concerned (flower, fruit or vegetable), and of the differences that indicate distinctions between the various varieties; in some cases, it is simply a matter of the etymology of a name but sometimes there are descriptions of preparation processes, such as that for rose-water, accompanied by advice for the cultivation of a plant, as is the case for the osmanthus, chrysanthemums and the six varieties of litchi that are cited. To sum up, this work produces very few details about the cultivation of plants but emphasises the aesthetic characteristics of flowering plants, the nutritional value of fruits, the various cultivars of some of them, and so on. It seems like an unfinished collection of notes of various kinds founded on the author's own experience.

Juan 27 to 30 of the *Nong zheng quan shu* 農政全書 (Complete Treatise on Agricultural Administration) (1639) by Xu Guangqi 徐光啟 (1562–1633), which are entitled 'Shu yi' 樹藝 (The Art of Plantations), constitute if not a short treatise on horticulture, then at least a treatise on vegetables and fruit. Xu Guangqi is a particularly interesting character,³⁸⁰ for, thanks to his important administrative and political posts, on the one hand, and his intellectual and religious contacts with the

³⁷⁸ Translations of some of the parts concerning eighteen flowering plants may be found in Koehn (1942).

³⁷⁹ Wang Yuhu (1979, p. 184).

³⁸⁰ On the biography of Xu Guangqi, see Liang Jiamian (1981); anon. (1983c); Dudink (2001b). On various aspects of his work and their historical context, see anon. (1983c) and Jami, Engelfriet and Blue (2001).

first Jesuit missionaries, on the other, he was able to play the role of a go-between between China and Europe, in particular in the domain of agriculture.³⁸¹ The *Nong zheng quan shu* is valuable because its contents are based on both knowledge transmitted by ancient texts and the author's own experience. In the passages that interest us here, the citations taken from ancient treatises are compared to the experience acquired in the course of the author's cultivation of plants in his own two gardens – one in Tianjin, the other in Shanghai. As the work was not finished when Xu Guangqi died, a group of zealous admirers organised the notes that he had put together.³⁸² 'The Art of Plantations' is divided into three parts, *luo bu* 蓏部: the 'Section on the Fruits of Grasses', 'Shu cai bu' 蔬菜部; the 'Vegetables Section'; and the 'Fruits Section', 'Guo bu' 果部. The first part is devoted to gourds, the aubergine, *Zizania* and root vegetables such as the sweet potato. The second concerns leafy vegetables and condiments. The third part is divided into two chapters corresponding to *juan* 29 and 30, which distinguish between the 'classic' fruit trees of northern China, such as jujube trees, peach trees, plum trees, Japanese apricot trees, apricot trees, pear trees, crab apple trees and pomegranate trees, on the one hand, and others that are less common: litchis, longans, bayberries (*Myrica rubra*), cherry trees, vines, ginkgos, loquats, various citrus trees, mulberries, Chinese quinces, hawthorns and sugar cane. The entries, of varying length, are all constructed according to the same principle and offer a compilation of notes, some of which are followed by remarks by Xu Guangqi, announced under his pseudonym *Xuan Hu xian sheng* 玄扈先生, 'Mister Xuan Hu'. These notes testify clearly to an interest in the acclimatisation both of southern cultivated plants introduced into the northern provinces and also northern ones transferred to the south. He always stresses the plants' qualities of resistance to the various factors that could prevent or impede their growth, in particular spells of great cold or of excessive heat. Although some of the entries are very short and contain only citations, there are others that are extremely detailed and that form a veritable little handbook, as is the case of the description of the cultivation of the sweet potato, which had been introduced only recently.³⁸³ We shall be meeting Xu Guangqi again in the course of the next three chapters.

The *Pei hua ao jue lu* 培花奧決錄 (Revelation of the Secrets of the Cultivation of Flowers), in contrast, takes the form of a treatise essentially devoted to a description of the techniques for cultivating ornamental plants, accompanied by a brief passage

³⁸¹ His description of European hydraulics in a chapter of the *Nong zheng quan shu* entitled *Tai xi shui fa* (Irrigation Methods in the Far West) (*juan* 19–20, pp. 475–520, in Xu Guangqi (1979)) is well known. For an English translation of *juan* 31 to 34 of the same work, on the cultivation of mulberry trees and silkworms, see Xu Guangqi (1849).

³⁸² On the *Nong zheng quan shu* see Wang Yuhu (1979, pp. 185–7), *SCC* Volume 6, Part II, pp. 64–70; Bray and Métaillé (2001). On a number of other technical texts by Xu Guangqi, see Hu Daojing (1985d; 1985e).

³⁸³ This text appears in volume 11 of the works of Xu Guangqi edited by Hu Daojing (1983). On the introduction of the sweet potato into China, see Liang Jiamian and Qi Jingwen (1980) and Liang Jiamian (1981).



Fig. 163. *Magnolia* (*yu lan* 玉蘭, *Magnolia* sp.), from *Pei hua ao jue lu* (1640, 15b).

on the organisation of pavilions. Compared to the earlier texts that we have considered, this treatise is quite original in that interest is centred solely on plants that provide enjoyment, and it excludes all other categories. The undated preface to the book bears only the given name of the author, Zhibo 知伯. Wang Yuhu thinks that his patronym is probably Sun 孫,³⁸⁴ as does Jiang Yin.³⁸⁵ The former believes that this is a text from the end of the Ming period or the early Qing period, and the latter, who suggests a date around the 1640s, shares that view. This treatise attaches great importance to the aesthetic aspect of plants. After the summary, we find twenty-one plates representing a variety of flowers. The quality of these images (see Figs. 163, 164 and 165) contrasts sharply with that of the images to be found in most *ben cao*.³⁸⁶ The first part of the book (pp. 9a–11b) again emphasises the aesthetic aspect and describes a number of ways to improve the spectacle that the various plants can create. Next come the methods of cultivating the flowers throughout the four seasons. These are presented for each of the plants in seventy-four selected entries. Some of these entries designate botanical species, as in the case of the peony shrub, ‘the emperor of flowers’, *mu dan*; the herbaceous peony, *shao yao*; the fragrant daphne, *rui xiang*; and the camellia, *Camellia sasanqua* Thunb., *cha mei* 茶梅, but they may also indicate wider classificatory levels such as bamboos, *zhu*, as a whole, ten distinct species of which are named, or chrysanthemums, *ju*. It is worth pointing out that all the plants cited are chosen purely for the interest of their flowers and that the information relating to the cultivation of the first four – the two peonies, the

³⁸⁴ Wang Yuhu (1979, p. 205).

³⁸⁵ Jiang Ying (1980b, p. 64).

³⁸⁶ On representations of plants in China, in particular in the *ben cao*, see Haudricourt and Métaillé (1994), Métaillé (2007b).



Fig. 164. *Hosta (yu zan 玉簪, Hosta plantaginea (Lam.) Aschers)*, from *Pei hua ao jue lu* (1640, 23a).

chrysanthemums and the *Cymbidium* – occupy twenty-five single pages, whereas the remaining seventy entries are dealt with on no more than thirty-four pages. That remark draws attention to the importance of the order of presentation of the objects in the texts, for it reflects their cultural importance in the eyes of the authors of these works. In the present case, this tendency is reinforced by the presence of the images of the plants that precede the chapters. They seem to me certainly to reflect the preferences of the author, if not indeed the dominant taste of his period. They are arranged in four categories that are distinguished in the preface and that present an original classification according to the feelings they arouse. The series starts, logically enough, with an illustration of the shrub peony, the very first in the category of ‘captivating beauties’, *yan ye lei* 艷冶類, and this is followed by an illustration of a herbaceous peony. Next come representations of the flowers of the peach tree, the magnolia (*yu lan 玉蘭*),³⁸⁷ the flowering apple tree, the camellia, the pear tree, the rose (*qiang wei 薔薇*),³⁸⁸ the apricot tree, the fragrant daphne, the pomegranate tree and the Chinese snowball tree (*xiu qiu 繡毬*).³⁸⁹ The second category, that of ‘calm and discreet plants’, *you jing lei* 幽靜類, begins with an image of a lotus; next, each on a separate page, come representations of a chrysanthemum, an orchid (*ou lan 甌蘭*),³⁹⁰ a lily magnolia (*xin yi 辛夷*),³⁹¹ a narcissus, a Banks rose (*mu xiang 木香*),³⁹² a rose (*bao xiang 寶相*),³⁹³ a gardenia (*zhi zi*), a daylily (*xuan hua 萱花*),³⁹⁴ a rose bush (*mei gui 玫瑰*),³⁹⁵ a jasmine (*mo li 茉莉*)³⁹⁶ and a blackberry lily

³⁸⁷ *Magnolia denudata* Desr. ³⁸⁸ *Rosa multiflora* Thunb. ³⁸⁹ *Viburnum macrocephalum* Fortune.

³⁹⁰ Probably a cymbidium, *Cymbidium* sp. ³⁹¹ *Magnolia liliflora* Desr. ³⁹² *Rosa banksiae* Aiton.

³⁹³ Variety of *qiang wei*, *Rosa multiflora* (Chen Hanbo 1989, Volume 3, p. 1646). ³⁹⁴ *Hemerocallis* sp.

³⁹⁵ *Rosa rugosa* Thunb. ³⁹⁶ *Jasminum sambac* (L.) Aiton.



Fig. 165. Spiderwort (*dan zhu* 淡竹, *Commelina communis* L.), from *Pei hua ao jue lu* (1640, 26a). Compare with Figs. 49, 52 and 61.

(*bian zhu* 扁竹).³⁹⁷ In the following category, that of 'charming and distinguished plants', *yun zhi lei* 韻致類, we find a begonia (*qiu hai tang* 秋海棠),³⁹⁸ a poppy (*li chun hua* 麗春花), a pink (*shi zhu* 石竹), a lily (*shan dan* 山丹),³⁹⁹ a cotton rose (*fu rong* 芙蓉),⁴⁰⁰ a tiger lily (*fan shan dan* 番山丹)⁴⁰¹ and a plantain lily (*yu zan* 玉簪).⁴⁰² The last category, that of 'eminent and distinguished plants', *jun yi lei* 俊逸類, includes the osmanthus (*dan gui* 丹桂),⁴⁰³ the bamboo, the Japanese apricot (*mei*), another lily (*ye he* 夜合),⁴⁰⁴ a winter jasmine (*ying chun* 迎春),⁴⁰⁵ a commeline (*dan zhu*

³⁹⁷ *Belacanda chinensis* DC.

³⁹⁸ *Begonia evansiana* Andr.

³⁹⁹ *Lilium concolor* Salisb.

⁴⁰⁰ *Hibiscus mutabilis* L.

⁴⁰¹ *Lilium lancifolium* Thunb. (Gao Minggan 2006, p. 374).

⁴⁰² *Hosta* sp.

⁴⁰³ *Osmanthus fragrans* Lour. var.

⁴⁰⁴ *Lilium brownii* F. E. Brown (Gao Minggan 2006, p. 205).

⁴⁰⁵ *Jasminum nudiflorum* Lindl.

淡竹),⁴⁰⁶ a hibiscus (*qiu kui* 秋葵),⁴⁰⁷ an orchid (*hui lan* 惠蘭),⁴⁰⁸ a wintersweet (*la mei* 臘梅) and a pine (*song*).

The importance of aesthetics does not relegate cultivation techniques to second place. Apart from details concerning the care appropriate for the first five plants cited, and following various individual entries for the rest, short specific paragraphs successively describe grafting, propagation by cuttings, sowing, transplanting, pruning, deterring parasites, correct implantation, protection against the cold, manuring and watering; and forty-two pages are devoted to cultivation techniques for potted plants, both herbaceous and ligneous, in order to create 'landscapes in pots', *pen jing* 盆景 (*bonkei* in Japanese). The part devoted to plants ends with ten pages in which one learns how to preserve in vases flowers cut from twenty or so trees or shrubs and also peonies and lotus flowers. This text, which does not appear to have circulated widely and excludes all other cultivated garden plants,⁴⁰⁹ seems to be just the book for enthusiasts of ornamental plants.

There is one book, which appeared after the collapse of the Ming dynasty, that definitely needs to be cited because, compared to all those described above, it is the only one that may be considered a complete treatise on the garden. The *Hua jing* 花鏡 (Mirror of Flowers) has an author's preface dated the twenty-seventh year of the reign of Emperor Kangxi (1688). Little is known of its author, Chen Fuyao 陳扶搖, personal name Haozi 溟子, surname Xi-hu 西湖花陰翁. His name appears in no official bibliography and only his preface provides a few indications as to his life. When he signed the preface he was seventy-seven years ('28,000 days') old, so he must have been born in 1612.⁴¹⁰ He was a native of Hangzhou, in the present province of Zhejiang, to the south of Shanghai. Actually, his nickname, 'the old man in the shade of the flowers of the Western Lake', refers directly to the town of his birth. One may well wonder, given that he was in his thirties when the Ming dynasty collapsed (1644), whether he did not retire from public life, as did many other literati patriots, in order to avoid serving the Manchus when they established the new Qing dynasty. He confesses to two exclusive passions, books and flowers, and in this connection records the teasing of his contemporaries, who said he was 'mad about flowers', *hua pi* 花癖, and a 'bibliomaniac', *shu chi* 書癡. Even if he confesses to not having much of a fortune and 'to possessing nothing but his paintbrushes and his books', a number of passages in the *Mirror* suggest that he was not really needy, for he had gardeners working for him. Such remarks also tell us that his knowledge of gardening was probably the fruit of direct observation rather than of experience derived from personal practice. Nevertheless, the book

⁴⁰⁶ *Commelina communis* L. (Gao Minggan 2006, p. 336).

⁴⁰⁷ *Abelmoschus manihet* (L.) Medicus (Gao Minggan 2006, p. 237).

⁴⁰⁸ *Cymbidium faberi* Rolfe (Wu Yingxiang 1991, p. 133). ⁴⁰⁹ Wang Yuhu (1979, p. 206).

⁴¹⁰ Feng Yuhuan (1959, p. 3).

that he composed is particularly valuable as it is so concrete. The original edition is in six parts, each corresponding to one *juan*.⁴¹¹ The first *juan* is a horticultural calendar in which we find, for each month, first some meteorological predictions and forecasts of possible calamities or conditions that are favourable for the cultivation of plants. This knowledge is partly founded on the association of, on the one hand, four factors, namely 'the nine furnaces' (*jiu jiao* 九焦), 'fire from Heaven' (*tian huo* 天火), 'fire from earth' (*di huo* 地火) and 'fallow land' (*huang wu* 荒蕪), and, on the other, one of the twelve signs of the 'Earthly Branches', *di zhi* 地支, which, when combined in a definite relationship with the ten 'Heavenly Stems', *tian gan* 天干, provide the symbols of the sexagesimal cycle and also information on the weather on certain particular days (festivals, the first days of a month (*jie qi*)). Next, after a short poetic description of the month, there are details relating to the horticultural activities that need to be carried out, listing the plants that are affected by each of them. The following *juan* provides the details of these gardening operations, under the title 'Ke hua shi ba fa' 課花十八法, 'Eighteen Methods of a Rational Treatment of Plants'. Here are the detailed heads of paragraphs:

How to discern the nature and temperaments of plants.

Preparing the plots for sowing and planting.

The marvellous process of grafting.

When to multiply by dividing seedlings.

How to take cuttings easily.

Transplantation with a clump of earth.

Ingenious fusion by approach (describing grafting by approach and open-air cuttings).

Sowing seed.

Harvesting and preserving crops.

How to water and spread manure correctly.

When to earth-up and manure.

Precautions against all insects and worms.

How to regenerate an old tree.

How to transform flowers; how to force them.

Planting in pots to create a landscape.

Care for cut flowers in vases.

Pruning and lopping.

How to preserve and prolong the fragrance of flowers.

This second part ends with three more paragraphs evoking the joys and pleasures that a garden can offer its owner. The three following parts describe ornamental plants individually; the third *juan* is devoted to 'the category of flowering trees', *hua*

⁴¹¹ This method of division, which is repeated in a number of later editions, was slightly altered in the edition of the text by Yi Qinheng (1962), who subdivided the third part into two, thereby obtaining a text in seven *juan*.

mu lei 花木類,⁴¹² and contains 100 rubrics, mostly entitled by the name of a particular botanical species; for five of them, the text adds the names of cultivars. In this way, we find mentions of 131 varieties of tree peonies (*mu dan*), twenty-one Japanese apricots (*mei*), nineteen camellias (*shan cha*), fourteen peach trees (*tao*) and seventy-five litchis (*li zhi*). The fourth part lists under the title *teng man lei* 藤蔓類, ‘category of lianas and climbers’, ninety-two rubrics, including bamboos, forty kinds of which are cited, most of them identifiable with botanical species. However, the forty-one kinds of mushroom of immortality (*Ganoderma sp.*, *ling zhi*), also classed in this category, are for the most part hard to recognise. Finally, the fifth part, ‘the category of flowering grasses’, *hua cao lei* 花草類, mentions 103 herbaceous flowers, adding, in some cases, the names of different varieties. Those cases include peonies, *shao yao* (eighty-eight cultivars); orchids (*Cymbidium*), *lan hua* (thirty-four cultivars); lotuses, *lian hua* (twenty-two cultivars); and chrysanthemums (154 cultivars). For each of the plants cited, the information given always includes a description of the plant, in many cases strongly inspired by what can be found in Li Shizhen’s *Ben cao gang mu* (1596). Chen Haozi also follows Li Shizhen in his choice of numerous names, without, however, acknowledging his source in any way.

The sixth and last part, ‘Yang qin niao fa’ 養禽鳥法, ‘Methods of raising Animals’, is entirely devoted to animals – birds, small beasts, fish and tortoises, and insects – which the author considers to be indispensable, for their movements and the sounds that they make, to give life to gardens. By the seasonal presence of some of them, they add to one of the principal attractions of such places for the Chinese – as also for the Japanese – since by this means one gains a clear understanding of the passage of time, which is also reflected in the cycles of the development of plants.

The various texts just described do not form a homogeneous group, nor have I produced an exhaustive list: in particular I have mentioned very few lost texts. Most of the works cited are the ones that have been the most used, because I consider these to be the most relevant to present research into ancient Chinese horticulture. I have preferred to present them in a chronological rather than a thematic order as it seems to me that this makes it easier to identify what their authors have picked up from one another. For a wider view of this literature, I consider the best work of reference to be Wang Yuhu’s book,⁴¹³ which is an unrivalled companion for anyone interested in the history of knowledge linked with agriculture and horticulture in China. For readers without any knowledge of

⁴¹² By distinguishing trees cultivated solely for their flowers (*hua mu* 花木) from those valued for both their flowers and their fruits (*hua guo* 花果), Yi Qinheng doubled the contents of *juan 3*, *hua mu lei kao* 花木類考, and added an extra division in the text, turning *juan 4* from a chapter devoted to flowering trees into one that also considered trees that were interesting because of their fruits (*hua guo lei kao* 花果類考). In this respect he differs from the other editions consulted, Chen Fuyao (1688); Chen Fuyao (1773); Chen Fuyao (1914); Chen Haozi (1956). A partial French translation has been made of the Chinese text of the 1773 Japanese edition, see Chen Haozi (2006).

⁴¹³ Wang Yuhu (1979).

Chinese, the book by Li Huilin, published in 1959, *The Garden Flowers of China*, remains very valuable.

(3) GARDENS

I propose not to present a history of gardens in China here, but rather to attempt an appreciation of the place that plants occupied there, according to a number of well-documented cases. The subject will therefore be envisaged essentially from the particular angle of the relations that the owners of gardens maintained with the plants that they chose to grow in them. Historical studies on gardens generally lay the emphasis on structural and architectural elements or on the cultural, social or economic functions of gardens.⁴¹⁴ With few exceptions,⁴¹⁵ the vegetation is treated more as a poor relation or, in some cases, may simply prompt lists of the names of the plants. In the present enquiry, the written sources that are consulted will provide us with information concerning, on the one hand, the large gardens, or rather parks, that belonged to high-ranking state-employed figures or rich merchants, and, on the other, the more modest spaces created by literati. After a brief description of the former, the role and place of plants in the latter will be studied in greater depth. This choice does not in any way reflect a lack of interest in the imperial parks, nor does it underestimate the importance of the garden buildings, water, rocks and animals in the pleasure gardens of China. Quite simply, rather, taking into account the literature that already exists and also the general theme of the present volume, it has seemed to me preferable to privilege a point that I consider to be crucial:⁴¹⁶ namely the reasons for the choice of the vegetation present in the gardens. On this question, we shall find relevant information only in the writings of literati garden enthusiasts.

(i) Definitions

First, let us try to see what should be understood by the word 'garden' in the context of China from antiquity down to the 17th century. Among the entries in the *Shuo wen jie zi* 說文解字 dictionary, the definitions of a number of characters clearly indicate points that are relevant to this idea. Thus *yuan* 苑: park (*SW*: the means by which one breeds wild birds and beasts *suo yi yang qin shou ye* 所以養禽獸也)⁴¹⁷ (Fig. 166) and *you* 囿: closed park (*SW*: park (*yuan*) with a low wall *yuan you yuan ye* 苑有垣也) (Fig. 167).⁴¹⁸ If the latter is inside an enclosure, presumably the former – the name of

⁴¹⁴ Alongside the classic works by Osvald Sirén (1949), Zhang Jiayi (1986) proposes a general history that adopts a formal approach, as does R. Steward Johnston (1991), while Wang Yi (1990) presents the gardens in a social context. Wu Gongzheng (1994) concentrates on the cultural context of pleasure gardens (*yuan lin*) under the Six Dynasties. Craig Clunas (1996) also favours a socio-cultural point of view in the very stimulating study that he devotes to the role of gardens in the lower Yangzi valley under the Ming dynasty.

⁴¹⁵ See Yu Shuxun (1980), Edwin T. Morris (1983), Oka (1988), Zhu Junzhen (1992).

⁴¹⁶ See Métailié (1998). ⁴¹⁷ Ding Fubao (1928, p. 401b). ⁴¹⁸ Ding Fubao (1928, p. 2728b).

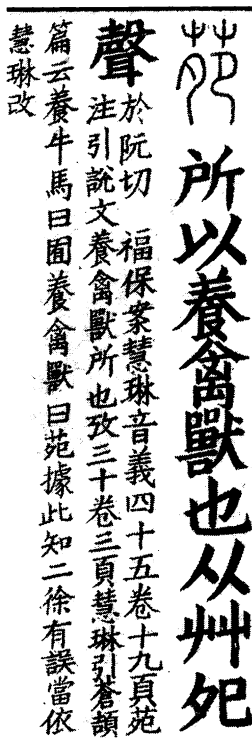


Fig. 166. Definition of *yuan* 苑 (farm/park) in *Shuo wen jie zi* (+121), ‘that which serves to raise wild birds and animals’ (*suo yi yang qin shou ye* 所以養禽獸也), from Ding Fubao (1928, p. 401b).

which serves to define this term – may be without walls on account of its greater dimensions. The reference to wild animals certainly implies that these are wooded spaces – as is confirmed by a more ancient graph of this character, which represents four trees inscribed within an enclosure 囿 – the woods being intended for the raising of animals. On the other hand, *yuan* 園 (*SW*: the means by which one cultivates fruit trees *suo yi shi guo ye* 所以樹果也)⁴¹⁹ (Fig. 162) and *pu* 圃 (*SW*: the means by which (one) cultivates vegetables (*suo yi zhong cai yue pu* (所以) 種菜曰圃) (Fig. 161),⁴²⁰ also enclosed, are reserved for the cultivation of trees, whether fruit-bearing or not, and kitchen-garden plants. The specific character of the latter two is explained clearly in the *Zhou li* 周禮. Among the estates mentioned right at the beginning of the text (‘Tian guan jia zai’ 天官家宰) in which the employees of the imperial household perform their tasks, are the *San nong* 三農 where the ‘nine grains’ grow, and the *yuan pu* 園圃 in which one ‘raises’ vegetables and fruits, *yu cao mu* 毓草木. The former correspond to the three types of environment in which

⁴¹⁹ Ding Fubao (1928, p. 2730a).

⁴²⁰ Ding Fubao (1928, p. 2730b).



Fig. 167. Definition of *yuan* 囿 (enclosure) in *Shuo wen jie zi* (+121), 'park with a low wall' (*yuan you yuan ye* 苑有垣也), from Ding Fubao (1928, p. 2728b).

grains are cultivated: high plateaux, plains and low-lying ground,⁴²¹ while the latter are gardens destined for 'grasses', vegetables and 'trees', the kind of trees that produce fruits.⁴²² The possible translations of the four terms that appear as entries in the *Shuo wen jie zi* that designate 'gardens' are thus respectively princely park and enclosure, orchards, and kitchen gardens. An expression attested later, in a poem by Zhang Han 張翰 of the Xi Jin dynasty (265–316),⁴²³ is *yuan lin* 園林, which refers to pleasure gardens of varying sizes that are conceived differently from the preceding gardens,⁴²⁴ but in which plants and garden buildings are still associated, and which I have therefore translated as 'villa gardens' (Fig. 168).⁴²⁵

⁴²¹ Lin Yin (1985, p. 13, n. 36).

⁴²² Lin Yin (1985, p. 13, nn. 38, 39).

⁴²³ Cf Luo Zhufeng (1986–94, Volume 3, p. 653).

⁴²⁴ Cf Wu Gongzheng (1994, p. 108).

⁴²⁵ Cf Liu Dunzheng (1980).

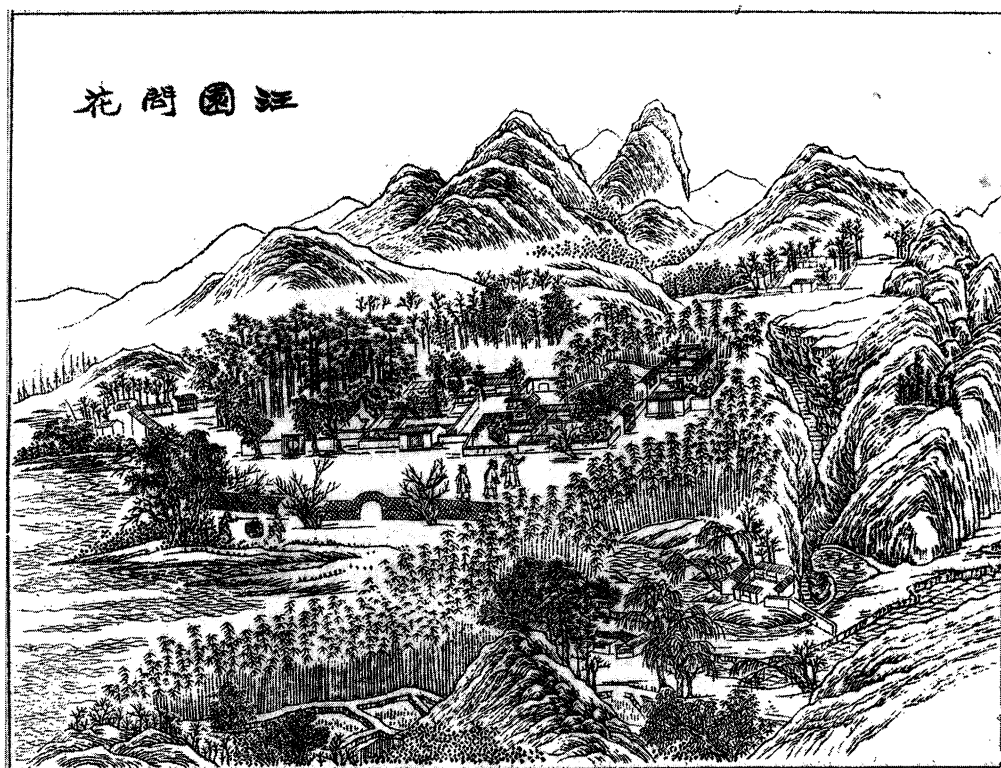


Fig. 168. An example of a 'villa garden', Wang Yuan 汪園 (the Wang Garden), from *Hong xue yin yuan tu ji* by Lin Qing (1884, p.13b, 3 *ji shang*).

(ii) *A glimpse of the great parks of antiquity*

Apart from dictionaries, one example of which we have just considered, what original texts can be used for a study of gardens in China? Remarkably enough, to this very day there exists only one treatise that systematically takes account of the structural aspect of gardens (architecture, layout, furnishing, ornamentation), the *Yuan ye* 園冶 (The Figuration of Gardens), composed between 1631 and 1634 by Ji Cheng 計成.⁴²⁶ However, as we have seen in the last chapter, a number of texts do provide information, sometimes of a detailed nature, about cultivating plants and even keeping animals (birds, bees etc.) that are suitable for a garden. The golden age of such treatises is the 17th century. As well as those technical books there are also other writings by literati that present a more personal approach and make it possible to get a sense of what the Chinese, in the course of history, expected from a garden. I should nevertheless stress how very rare are the texts that provide an

⁴²⁶ The references to plants in this treatise will be listed at the end of this chapter, pp. 472–3.

inventory of the plants to be found growing in a particular garden. As a general rule, we find on the one hand numerous texts that describe a garden and its atmosphere but in which there is never an exhaustive list of the plants, and on the other texts such as *Luoyang hua mu ji* 洛陽花木記 by Zhou Shihou, or *Zhi pin* 植品 (Appreciation of Plants) by Zhao Han 趙嘏, which take the form of lists in which the authors seem to be aiming for exhaustiveness and, to that end, appeal both to their own practical experience as gardeners or as plant enthusiasts and to their reading. The most ancient text on a pleasure garden is a poem in the *Shi jing* 詩經, Book of Odes, which probably dates from the 11th century BC. The poem is no 242: 'Ling tai' 靈臺, 'The Terrace of Marvels'. Here is a revised version of a translation by Father Couvreur:⁴²⁷

1. He [Emperor Wen] made measurements and began to build the Terrace of Marvels; he measured and laid out the foundations. All the population worked on it and it was completed in less than one day. The Prince had certainly told them not to hurry but all his subjects had rushed to help, like sons running to their father.
2. The Prince walks in the Park of Marvels (*ling you* 靈囿); there are plump does and deer with shining coats; white birds stretch their resplendent wings. The prince approaches the Pool of Marvels: oh! It is full of fish, playing around.
3. Finely decorated awnings are set up: drums and bells are ready. Their sound is so harmonious. What joy around the circular lake!
4. How harmonious is the sound of the drums and bells! What joy around the circular lake! The alligator-skin drums beat softly and the blind musicians sing their songs.

Strangely enough, not a single plant is mentioned and this enclosed garden seems to be above all a game reserve, with its beautiful birds, its sleek animals and its pond teeming with fish. It is also a place of the rejoicing that surrounds the emperor. The dithyrambic description of another prestigious park, the Shang Lin 上林, in Chapter 117 of the *Shi ji* 史記, in the biography of Sima Xiangru 司馬相如,⁴²⁸ is far more detailed.⁴²⁹ This imperial park of the Qin, ruined at the beginning of the Han dynasty, was restored and enlarged as early as -137, by order of the Han Emperor Wu, who ruled from -140 to -87.⁴³⁰ The *Xi jing za ji* 西京雜記 (Miscellanies on the Western Capital) by Ge Hong 葛洪 (283-364) contains a partial description of it that mentions its plants. The following

⁴²⁷ Couvreur (1896, p. 341); Xiang Xi (1986, p. 859).

⁴²⁸ See Sima Qian (1972, Volume 9, pp. 3016-42). On the fruit trees named in the text by Sima Xiangru, see Xin Shuzhi and Yi Qinheng (1983, pp. 55-60).

⁴²⁹ The names of the plants cited pose many problems of identification and so also of translation. See the remarkable work of two translators, Yves Hervouet (1972, pp. 57-109) and David Knechtges (Xiao Tong 1990, pp. 73-114).

⁴³⁰ Its remains are located to the west of Xi'an, on the border between Zhouzhi and Huxian (Chen Hanbo 1986-93, Volume 1, p. 275).

translation of the passages that mention the four first fruit trees gives some idea of the nature and richness of this text:⁴³¹

At the beginning of the construction of the imperial park, crowds of high-ranking figures came from distant regions to offer remarkable fruit trees and exotic trees . . . Ten [kinds of] pear tree (*li* 梨): purple ones, bronze ones with large fruit, perfumed ones with small fruit, 'large-grain' pear trees, pear trees with small leaves, ones with spear-shaped leaves, ones with golden leaves, ones from the northern Gobi, resistant to the cold, ones from the emperor of the East, which come from the middle of the seas, ones with purple branches. Seven [kinds of] jujube tree (*zao* 棗), jujube trees with flexible branches, jujube trees from the Jade Gate, apple-jujube trees, jujube trees with dark green flowers, tender jujube trees, jujube trees with vermilion hearts, jujube trees from the Emperor of the West that come from the Kunlun mountains. Four [kinds of] chestnut tree (*li* 栗), the elegant chestnut, the hazel-chestnut, the extraordinary chestnut, the Yiyang chestnut tree with fruits as large as a fist. Ten peach trees (*tao* 桃), the Qin peach,⁴³² the mountain peach, the peach with pink fruit, the Jincheng peach,⁴³³ the peach with ornate leaves, the peach with fruits with purple veins, the peach of frosts with fruits that are eaten when the weather is icy, and the peach of the Hu Barbarians⁴³⁴ (*ying tao* 櫻桃 and *han tao* 含桃).⁴³⁵

The next to be cited are fifteen varieties of plum tree (*li* 李),⁴³⁶ three kinds of apple tree (*nai* 奈),⁴³⁷ three kinds of hawthorn (*zha* 查),⁴³⁸ three kinds of buckthorn (*bei* 棓),⁴³⁹ four kinds of pear tree (*tang* 棠),⁴⁴⁰ seven kinds of Japanese apricot tree (*mei* 梅),⁴⁴¹ two kinds of apricot tree (*xing* 杏), and three kinds of *tong* 桐 – *Paulownias* and *Firmiana*. There were also ten plants of another apple tree (*lin qin* 林檎),⁴⁴² ten loquat plants (*pi pa* 枇杷),⁴⁴³ ten sweet orange plants (*tian cheng* 甜橙),⁴⁴⁴ ten pomegranate (*shi liu* 石榴) plants, ten pear (*ting* 棃) plants,⁴⁴⁵ ten holly (?) (*bai yin shu* 白銀樹, 'the tree of white silver') plants,⁴⁴⁶ ten *huang yin shu* (= ?) 黃銀樹 ('the tree of yellow silver') plants, 640 *Sophoras* (Chinese scholar trees) (*huai* 槐).⁴⁴⁷ There were also ten *qian nian chang sheng shu* 千年長生樹 ('the tree of 1,000 years 'longevity')

⁴³¹ Text of Ge Hong, *juan* 1, pp. 6b–7b, in Si Bu Cong Kan 四部叢刊, Zi Bu 子部; modern edition Ge Hong (1999). This text is also attributed to Liu Xin 劉歆 (Q/Han) and, more certainly, to Wu Jun 吳均 (Liang).

⁴³² Today Shaanxi province 陝西 (Shensi).

⁴³³ According to the *Nong shu* by Wang Zhen, this was in truth a walnut tree native to the western territories beyond Dun-huang, which bore delicious fruit; see Wang Yuhu (1981a, p. 127).

⁴³⁴ This was actually a walnut tree (*hu tao* 胡桃), *Juglans regia* L.

⁴³⁵ *Ying tao* and *han tao* are today considered synonyms for a cherry tree, *Prunus pseudocerasus* Lindl. (= *Cerasus pseudocerasus* (Lindl.) G. Don). We have already noted that the folk *tao* genus includes all peach trees and other folk taxa, such as not only cherry trees (*ying tao* and *han tao*), but also the walnut tree (*hu tao*) and the almond tree (*pian he tao*, literally 'peach tree with an oblique stone') and the kiwi (*mi hou tao*, literally, 'macaque peach tree').

⁴³⁶ *Prunus salicina* Lindl. (Yu 1979, p. 55). ⁴³⁷ *Malus pumila* Mill. (Yu 1979, p. 98).

⁴³⁸ *Zha* 查, a graphic variant of *zha* 楂, synonym of 山楂 (today *Crataegus pinnatifida* Bge. (Yu 1979, p. 140)), seems to me to have a generic sense, hence the translation 'hawthorn', *Crataegus* sp.

⁴³⁹ According to the *Ming yi bie lu*, *bei* is synonymous with *shu li* 鼠李, hence the choice of the translation. Another possibility is to consider another synonym, *bei shi* 棓柿, a term that designates a persimmon with small black fruits from which a varnish is obtained (see Luo Zhufeng, 1986–94, Volume 4, p. 1118), probably a *Diospyros lotus* L.

⁴⁴⁰ *Pyrus phaeocarpa* Rehd. After Mou Qiyu (1982, 208). ⁴⁴¹ *Prunus mume* (Sieb.) Sieb. et Zucc.

⁴⁴² *Malus asiatica* Nakai = *Malus prunifolia* Borkh. var. *rinki* Relider (Yu Dejun 1982, p. 100).

⁴⁴³ *Eriobotrya japonica* (Thunb.) Lindl. ⁴⁴⁴ *Citrus sinensis* (L.) Osbeck (Yu 1979, p. 291).

⁴⁴⁵ *Pyrus ussuriensis* Maxim. (Yu 1979, p. 124). ⁴⁴⁶ (?) *Ilex rotunda* Thunb. ⁴⁴⁷ *Sophora japonica* L.

(= ?) plants, ten *wan nian chang sheng shu* 萬年長生樹 ('the tree of 10,000 years' longevity') (= ?) plants, four *fu lao mu* 扶老木 ('wood that supports old men') (= ?) plants,⁴⁴⁸ ten *Sophora (shou gong huai)* 守宮槐 plants,⁴⁴⁹ twenty *jin ming shu* 金明樹 ('tree resplendent with gold') (= ?) plants, ten *yao feng shu* 搖風樹 ('tree moving in the wind') (= ?) plants, ten *ming feng shu* 鳴風樹 ('tree singing in the wind') (= ?) plants, seven *liu li shu* 琉璃樹 ('tree of lapis lazuli') (= ?) plants, ten *chi li shu* 池離樹 ('tree distant from pools of water') (= ?) plants, ten *li lou shu* 離婁樹 ('tree with embossing') (= ?) plants, ten plants of wild pear tree (*du* 杜),⁴⁵⁰ sweet olive (*gui* 桂),⁴⁵¹ varnish tree from the land of Shu (*shu qi* 蜀漆),⁴⁵² four of phoebe plants (*nan* 楠),⁴⁵³ seven specimens of fir (*cong* 樅),⁴⁵⁴ ten specimens of the Chinese juniper tree (*gua* 桧),⁴⁵⁵ four specimens of cherry tree (*xie* 榎),⁴⁵⁶ four specimens of liquidambar (*feng* 楓).⁴⁵⁷ After this list, Ge Hong adds that, in the documents that he has been able to consult, he has found the names of two thousand kinds of plant. Nothing is said about the tastes of the emperor where plants are concerned and it seems that actually his garden simply provides the framework within which the botanical rarities that he is sent can be planted. The first lines of the text do indeed indicate that this park contains the plants brought as tribute from various regions of the empire and from beyond it; this testifies to the space's function as symbolic representation, which makes it a kind of 'botanico-political' garden that suggests all the diversity and richness of the domain of influence of the reigning emperor. No doubt the envoys who brought these exceptional plants from their native provinces or principalities were flattered to know that their gifts would find a place in this prestigious place. It would be interesting to know in what form these trees were brought: as seeds or as young cuttings in pots? No doubt in both those forms.

As Edward Schafer explains, in the course of the Tang period (+618 to +907), 'the great age of innovation in floriculture', there was an evolution that 'accompanied a gradual change from the appreciation of nature, compressed into the space of a garden, as a universal symbol, to the feeling for plants and birds as individual and unique aesthetic objects'.⁴⁵⁸ The example that follows provides a particular

⁴⁴⁸ Possibly a synonym for *fu lao zhang* 扶老杖; in that case, this would be a variety of viburnum, *Viburnum plicatum* Thunb. var. *tomentosum* (Thunb.) Miq., according to Gao Minggan (2006, p. 141).

⁴⁴⁹ *Sophora japonica* var. *pubescens* (Tausch.) Bosse, according to Gao Minggan (2006, p. 136).

⁴⁵⁰ *Pyrus betulafolia* Bge., according to Mou Qiyu (1982, p. 208). ⁴⁵¹ *Osmanthus fragrans* Lour.

⁴⁵² *Dichroa febrifuga* Lour., according to Gao Minggan (2006, p. 402). The land of Shu is present-day Sichuan.

⁴⁵³ *Phoebe nanmu* Gamble.

⁴⁵⁴ *Abies delavayi* Franchet, according to Jia Zuzhang and Jia Zushan (1955, Fig. 2118).

⁴⁵⁵ Through the synonymy of *gua* and *gui* 檜 (see Luo Zhufeng, 1986–94, Volume 4, p. 976), *Sabina chinensis* (L.) Antoine (= *Juniperus chinensis* L.) in Fèvre and Métaillé (2005, p. 158).

⁴⁵⁶ *Cerasus pseudocerasus* (Lindl.) G. Don, according to Gao Minggan (2006, p. 381). In this text, three names designating cherry trees all refer to the same botanical species. Given that, at the beginning of his text, the author distinguishes between different kinds of the same folk genus and, later on, mentions the number of individual ones that are all of the same kind, we may assume (provided the identification is correct, of course) that these three cherry trees possess characteristics that are sufficiently distinct for them to be considered different varieties.

⁴⁵⁷ *Liquidambar formosana* Hance, according to Jia Zuzhang and Jia Zushan (1955, Fig. 1182).

⁴⁵⁸ Schafer (1965, p. 105).

illustration of the personal tastes of a man who was an enthusiast of botanical rarities, by way of a description that takes the form of a list of the plants in his garden.

(iii) *Literati and plants*

The behaviour of a scholar such as Li Deyu 李德裕 (787–850), who, after holding the highest ministerial posts, died in exile on the island of Hainan,⁴⁵⁹ is most revealing. He left a text in which he cites the exceptional plants and stones that he brought together in the garden that he established fifteen or so kilometres to the east of Luoyang, in a place known as Ping Quan Zhuang 平泉莊 in around +825.⁴⁶⁰ In this *Ping quan shan ju cao mu ji* 平泉山居草木記 (Notes on the Plants of My Mountain Dwelling Ping Quan), Li Deyu begins by noting that a reading of the *Yuan ting cao mu shu* 園亭草木疏⁴⁶¹ (Commentaries on Garden Plants) made it possible for him, knowing what his predecessors had appreciated, to develop his own tastes. After recalling the important posts that he had filled for twenty years (from +822 onward⁴⁶²), he explains that, being an enthusiast of remarkable trees and beautiful herbaceous plants, he had received many items as gifts from his colleagues and also from woodcutters. From being quite small initially, he writes, they are now more than six feet tall. Finally, having acquired a wide knowledge of the names of plants through studying the poems of the *Shi jing*, and thanks to his reading of the *Li sao*, being in a position to savour the beauty of delicate flowers, he has made notes distinguishing the mountain plants from those of damp localities. It is clear from the start that he is keen to show that this is not some futile passion of his, but an orthodox undertaking on the part of an educated man, for one of Confucius' exhortations to his disciples was to study the names of plants and animals in the *Shi jing*.⁴⁶³ His own appreciation of plant life thus results not simply from strolling around through nature, but from studying the canonical works. For a reader of today, the main difficulty with this text, as in the case of that by Ge Hong, is that of even an approximate botanical identification of the plants cited. I nevertheless think that a complete list of the names will be interesting, even if some of them must remain as question marks.⁴⁶⁴ Let us start with the mountain plants. He writes as follows:⁴⁶⁵

⁴⁵⁹ See Schafer (1970, pp. 86–8). ⁴⁶⁰ Chen Zhi (1983, p. 10).

⁴⁶¹ The author, Wang Fangqing 王方慶, who had been prime minister during the reign of the Tang Emperor Wu Hou (690–701), had received a monopoly over the canton of Shi-juan. See Chen Zhi (1983, p. 11, n. 1). This work disappeared very early on, as it is not mentioned in the bibliography of the Song. See Wang Yuhu (1979, p. 39).

⁴⁶² Chen Zhi (1983, p. 11, n. 2). ⁴⁶³ See *Lun yu*, Chapter 17, 9. See p. 5 above.

⁴⁶⁴ The principal source for these identifications and for all the rest that are suggested in this chapter, alongside the bibliographical references that are mentioned, is the dictionary compiled by Fèvre and Métailié (2005), although this is not always mentioned systematically. In Schafer (1965), too, reliable identifications can be found, but not in Belpaire (1959b). Paradoxically enough, very few of these names are given in the dictionary compiled by Gao Minggan (2006), although it is very rich in other respects.

⁴⁶⁵ Chen Zhi (1983, pp. 10–11).

[Among the garden trees], those that are remarkable [are] the golden larch (*jīn sōng* 金松)⁴⁶⁶ and the 'tree of jade' (*qī shù* 琪樹),⁴⁶⁷ which come from the Tian tai 天臺 [mountain];⁴⁶⁸ the Chinese flowering apple (*hǎi táng* 海棠),⁴⁶⁹ the *Torreya* (*fēi* 榧)⁴⁷⁰ and the *Sophora* (*huái* 槐) from Jishan 稽山;⁴⁷¹ the red osmanthus (*hōng guì* 紅桂)⁴⁷² and the magnolia (*hòu pō* 厚朴)⁴⁷³ from Shanxi 剡溪;⁴⁷⁴ the 'fragrant tamarisk' (*xiāng chéng* 香檉)⁴⁷⁵ and the lily magnolia (*mù lán* 木蘭)⁴⁷⁶ from Haiqiao 海嶠;⁴⁷⁷ the 'dark green genie' (*qīng shén* 青神) and the 'gathering of the wind' (*fēng jī* 風集) from Tianmu 天目;⁴⁷⁸ the 'moon osmanthus' (*yue guì* 月桂),⁴⁷⁹ the 'dark green blowing of [the wind]' (*qīng sōu* 青飀) and the bayberry (*yáng méi* 楊梅)⁴⁸⁰ from Zhong shan 鍾山;⁴⁸¹ the 'mountain osmanthus' (*shān guì* 山桂)⁴⁸² and the 'warm tree' (*wēn shù* 溫樹) from Qu'a 曲阿;⁴⁸³ the 'cypress with pearls' (*zhū bǎi* 珠柏), the golden-rain tree (*luàn jīng* 樂荊)⁴⁸⁴ and the Indian azalea (*dù juān* 杜鵑)⁴⁸⁵ from Jinling;⁴⁸⁶ the wild peach (*shān táo* 山桃),⁴⁸⁷ the Chinese arborvitae (*cè bǎi* 側柏)⁴⁸⁸ and the 'candle of the south' (*nán zhū* 南燭)⁴⁸⁹ from Maoshan 茅山;⁴⁹⁰ the Chinese weeping cypress (*liú bǎi* 柳柏),⁴⁹¹ the 'rosary pea' (*hōng dòu* 紅豆)⁴⁹² and a Nanking

⁴⁶⁶ Possibly *Pseudolarix kaempferi* (Lindl.) Gord., *jīn qián sōng* 金錢松, synonymous with *jīn sōng* (Fèvre and Métaillé 2005, p. 239). The resemblance of the leaves to those of *mai mén dōng* 麥門冬, noted by Duan Chengshi in the *You yang za zu* (Chen Zhi 1983, p. 12, n. 5), supports this hypothesis. See the description of the tree in Zheng Wanjuan (1983, p. 254).

⁴⁶⁷ Schafer (1965, p. 108, n. 13) identifies this term with *Nandina domestica* Thunb. Taking into account the reference to the name of jade, *qī*, this may be the *leucocarpa* variety that bears fruit of a greenish yellow colour, today named *yù guo nán tiān zhū* 玉果南天竹, 'sacred bamboo with jade fruits'. See Chen Junyu (ed.) (1990, p. 284).

⁴⁶⁸ The Zhejiang mountain to the south-west of Hangzhou.

⁴⁶⁹ *Malus spectabilis* (Ait.) Borkh., according to Yu Dejun (1982, p. 102). ⁴⁷⁰ *Torreya* sp.

⁴⁷¹ Mountain close to present-day Shaoxing.

⁴⁷² *Osmanthus fragrans* var. *aurantiacus* Mak. Given that *hōng guì* is synonymous with *dān guì* 丹桂 according to the *Zhī wú míng shì tu kǎo* cited in Chen Zhi (1983, p. 12, n. 7).

⁴⁷³ *Magnolia officinalis* Rehd. et Wils.

⁴⁷⁴ The upper course of the Cao-e 曹娥江 in Zhejiang. See Xie Shouchang et al. (1982, p. 682). In the canton of Sheng 嵊縣. See Chen Zhi (1983, p. 12, n. 7).

⁴⁷⁵ *Tamarix* sp. ? ⁴⁷⁶ *Magnolia liliflora* Desr.

⁴⁷⁷ Mountain in the present-day province of Guangdong, to the north of Hong Kong.

⁴⁷⁸ Mountain in Zhejiang province, north-west of Hangzhou.

⁴⁷⁹ *Yue guì* today designates the laurel, *Laurus nobilis* L., of Mediterranean origin, which was probably not yet introduced into China. Furthermore, the description of the tree given by the *You yang za zu* does correspond to that of a laurel tree. See Chen Zhi (1983, p. 12, n. 11).

⁴⁸⁰ *Myrica rubra* (Lour.) Sieb. et Zucc.

⁴⁸¹ Today the Zijinshan 紫金山 in Nanjing. See Chen Zhi (1983, p. 12, n. 10).

⁴⁸² Possibly a cinnamon tree, *Cinnamomum japonicum* Sieb.

⁴⁸³ Today Dan-yang 丹陽 in Jiangsu. See Chen Zhi (1983, p. 12, n. 11).

⁴⁸⁴ *Koeleruteria bipinnata* Franch. On account of the synonymy with *fù yǔ yè luàn shù* 复羽葉樂樹, according to Chen Zhi (1983, p. 12, n. 12).

⁴⁸⁵ *Rhododendron simsii* Planch. ⁴⁸⁶ Ancient name of Nanjing.

⁴⁸⁷ This is probably David's peach tree, *Prunus davidiana* Franch., a wild peach tree that is today used as grafting stock.

⁴⁸⁸ *Platycladus orientalis* (L.) Franco (= *Thuja orientalis* L. *Biota orientalis* (L.) Endl.).

⁴⁸⁹ Probably *Lyonia ovalifolia* (Wall.) Drude (= *Xolisma ovalifolia* Rehd.). However, according to Chen Zhi (1983, p. 12, n. 13) there may be a confusion here between two different plants, as a result of a double synonymy: (1) *nán zhū* = *nán tiān zhū* 南天竹, *Nandina domestica* Thunb., the heavenly bamboo, and (2) *wū fān cǎo* 烏飯草, *Vaccinium bracteatum* Thunb., an oriental blueberry. In my own opinion, this interpretation is dubious, for the name that these authors consider for the second hypothesis is not *nán zhū* but *nán zhū cǎo mǔ*; besides, the first hypothesis is not documented.

⁴⁹⁰ Mountain in Jiangsu to the south-west of Nanjing.

⁴⁹¹ *Liu bai* is synonymous with *bai mu*, according to Chen Zhi (1983, p. 12, n. 14): *Cupressus funebris* Endl.

⁴⁹² *Hōng dòu* is ambiguous, since this name can designate several different plants. See the interpretation of Schafer (1965, p. 108), who believes this is a 'necklace tree', *Omosia* sp. I myself favour a different interpretation, see note 515 in this chapter.

cherry (*shan ying* 山櫻)⁴⁹³ from Yichun 宜春;⁴⁹⁴ and finally the chestnut (*li* 栗),⁴⁹⁵ the pear (*li* 梨)⁴⁹⁶ and the 'cypress-dragon' (*long bai* 龍柏)⁴⁹⁷ from Lantian 藍田.⁴⁹⁸ The most beautiful aquatic plants are the lotus (*chong tai lian* 重臺蓮)⁴⁹⁹ from the island of Baiping, Baipinzhou 白萍洲,⁵⁰⁰ the white lotus (*bai lian* 白蓮) from Lake Furong 芙蓉湖⁵⁰¹ and the *fang sun* 芳蓀⁵⁰² from the Brook of the East, Dongxi 東溪, in Maoshan ...

In the Ji-Wei year (839) I received the camellia (*shan cha* 山茶)⁵⁰³ from Fanyu 番禺,⁵⁰⁴ the lilac (*zi ding xiang* 紫丁香)⁵⁰⁵ from Yuanling 苑陵,⁵⁰⁶ the double flowered cotton rose (*bai ye mu fu rong* 百葉木芙蓉)⁵⁰⁷ and the rose with double flowers (*bai ye qiang wei* 百葉薔薇)⁵⁰⁸ from Huiji 會稽,⁵⁰⁹ the purple osmanthus (*zi gui* 紫桂) and the *cu die* 簇蝶 from Yongjia 永嘉,⁵¹⁰ the 'maritime photinia' (*hai shi nan* 海石楠) from Tiantai 天臺, the sweet-scented oleander (*ju na wei* 俱那衛)⁵¹¹ from Guilin 桂林, and strange rocks from various mountains ... This year I have also obtained the cotton rose (*tong xin mu fu rong* 同心木芙蓉)⁵¹² from Zhongling 鍾陵,⁵¹³ the 'pure red osmanthus' (*zhen hong gui* 貞紅桂) from Shanzhong 剡中; the azalea of the four seasons (*si ji du juan* 四季杜鵑),⁵¹⁴ the *xiang si* 相思,⁵¹⁵ the *zi yuan* 紫苑, the Japanese glorybower (*zhen tong* 貞桐),⁵¹⁶ the mountain tea plant (*shan ming* 山茗),⁵¹⁷ the rose (*chong tai qiang wei* 重臺薔薇)⁵¹⁸ and the vitex (*huang jing* 黃荊)⁵¹⁹ from Jishan 稽山; the cassia (*mu gui* 牡桂),⁵²⁰ the *du shi* 杜石 and the *shan nan* 山楠⁵²¹ from Dongyang 東陽.⁵²² From Jiuhuashan 九華山 the following medicinal plants came: prince's feather⁵²³ (*tian liao* 天蓼),⁵²⁴ *qing li* 青櫪, *huang xin lao zi* 黃心栳子, *zhu shan* 朱杉, *long gu* 龍骨. In the year geng-shen (840) I also received from Yichun 宜春 Chinese photinia (*bi shu* 筆樹),⁵²⁵ *nan mu* 楠木,⁵²⁶ *chui zi* 椎子, *jin jing* 金荊, *hong bi* 紅筆, *mi meng* 蜜蒙, *gou li* 勾栗 and *mu dui* 木堆. Among the medicinal plants I also had an alpinia (*shan jiang* 山薑)⁵²⁷ and the 'azure lily' (*bi bai he* 碧百合).

⁴⁹³ *Prunus tomentosa* Thunb. (= *Cerasus tomentosa* (Thunb./Wall.)). ⁴⁹⁴ Yi-chun, in Jiangxi province.

⁴⁹⁵ *Castanea mollissima* Blume. ⁴⁹⁶ *Pyrus* sp.

⁴⁹⁷ Cultivar of *gui* 檜, the Chinese juniper tree (see Luo Zhufeng, 1986-94, Volume 12, p. 1472).

⁴⁹⁸ In the present-day province of Shaanxi.

⁴⁹⁹ Cultivar of lotus, *Nelumbo nucifera* Gaertn. Probably a variety that has stamens partly attached to a particularly well-developed pistil.

⁵⁰⁰ In the lakes region, Huzhou 湖州. ⁵⁰¹ At Wuxi.

⁵⁰² A fragrant herbaceous plant growing in humid places. The dictionaries consulted do not make it possible to be more specific. See Luo Zhufeng (1986-94, Volume 4, pp. 313-14).

⁵⁰³ *Camellia japonica* L. ⁵⁰⁴ Present-day Guangzhou (Canton). ⁵⁰⁵ *Syringa oblata* Lindl.

⁵⁰⁶ Present-day Xuan-cheng 宣城 in Anhui. ⁵⁰⁷ Cultivar of *Hibiscus mutabilis* L.

⁵⁰⁸ Cultivar of *Rosa multiflora* Thunb. ⁵⁰⁹ Mountain in Zhejiang, to the south-east of Shaoxing.

⁵¹⁰ Present-day Wenzhou, in Zhejiang.

⁵¹¹ Synonym of *jia zhu tao* 夾竹桃 (Luo Zhufeng, 1986-94, Volume 1, p. 1497). Hence *Nerium indicum* Mill.

⁵¹² Cultivar of *Hibiscus mutabilis*. ⁵¹³ Present-day Nan-chang. ⁵¹⁴ Cultivar of *Rhododendron simsii*.

⁵¹⁵ *Abrus precatorius* L., a shrub that symbolises waning love, evoked in a famous poem by Wang Wei (701-61?, Fig. 698-759) entitled 'Xiang si' 相思, 'Languishing'. The seeds, which are red with black marks, contained in the pods of this shrub were used for measuring weights and for trimming clothes. They are named *xiang si zi* 相思子.

⁵¹⁶ Synonym of *cheng tong* 楨桐 (Fèvre and Métaillé 2005, p. 577); hence *Clerodendron japonicum* (Thunb.) Sweet (= *Clerodendron kaempferi* (Jacq.) Sieb.).

⁵¹⁷ Possibly a species of camellia, *Camellia* sp.

⁵¹⁸ Flowers in which the stamens are partially attached to the gynaeceum, forming a sort of little column at the heart of the corolla.

⁵¹⁹ *Vitex negundo* L. ⁵²⁰ *Cinnamomum cassia* Presl. ⁵²¹ *Phoebe chinensis* Chun. ⁵²² In Zhejiang.

⁵²³ In Gui-chi 貴池, Anhui. ⁵²⁴ *Polygonum orientale* L. ⁵²⁵ *Photinia serrulata* Lindl.

⁵²⁶ *Cinnamomum bodinieri* Lévl. ⁵²⁷ *Alpinia japonica* Miq.

It is worth noting that in the lists that he makes of his acquisitions, Li Deyu always specifies their provenance. Most of the plants come from the lower Yangzi valley, in particular from Zhejiang where Li Deyu certainly still had some friends, or even from more southern regions. Given the number of rare plants gathered together here, Edward Schafer considers the place to be a kind of 'miniature imperial park of the ancient sort',⁵²⁸ while the author of a French translation of the text, Bruno Belpaire, thinks that Li Deyu 'is more of a collector of rare living plants than a garden artist' and that this collection of plants 'is closer to our idea of a botanical garden than to that of a rock garden'.⁵²⁹ Given those two views, the absence of a peony shrub may be found surprising, for the plant was already in high demand. For my own part, I see these specimens that Li Deyu says that he has 'obtained', 得, primarily as a mark of loyalty and deference on the part of those who have sent them from regions where he had lived as an official. Could not this garden, with its exceptional stones from those same regions, have been above all a nostalgic place where the plants and minerals recalled to the garden's creator memories of the past? It could also be seen as the work of a rather snobbish aesthete who is proud of the rarities that he has assembled, the origins of which he is careful to specify. In any event this was someone with a very sensitive appreciation of plants and Edward Schafer, for instance, emphasises his taste for azaleas and fancies that it stems from his reading of a poem by Bai Juyi which is devoted to that plant.⁵³⁰ Likewise, Schafer, upon reading a number of passages that Duan Chengshi, a close friend of Li Deyu, had devoted to him in the supplement to the *You yang za zu*, makes the following comment: 'Duan's notes tell us only a little about rare plants ... in the Ping juan garden, but he transmits all sorts of lore acquired from Li Deyu, who appears in these pages in the guise of an authority on horticulture'.⁵³¹

Let us now leave this extraordinary garden and consider others, places where plants were introduced not only from other regions but also from foreign countries if there appeared to be a good chance of the plants' adapting well to the new environmental conditions. These were Buddhist monasteries, all of which possessed kitchen gardens, orchards and other places reserved for the cultivation of trees and flowers.⁵³² When foreign monks arrived or Chinese ones returned from their travels abroad, new plants were added to the already numerous ones flourishing in monasteries: for instance, the *he li le* 訶黎勒, the black myrobolan,⁵³³ the fruits of which were medicinal and were also used for tanning,⁵³⁴ the *sha luo* 莎羅,⁵³⁵ the robust shorea/sal, the *bo luo mi* 菠蘿蜜 or 波羅蜜,⁵³⁶ the jackfruit, all of which came

⁵²⁸ Schafer (1965, p. 108).

⁵²⁹ Belpaire (1959b, pp. 87–8).

⁵³⁰ Schafer (1965, p. 112).

⁵³¹ Schafer (1965, p. 109).

⁵³² Xie Chongguang (1989, p. 1).

⁵³³ *Terminalia chebula* Retz.

⁵³⁴ Uphof (1968, p. 515). 'Its fruit, known by the name black myrobolan, is one of the best tanning agents in India', cited from Lanessan (1886, p. 619). According to the same source (p. 314), its wood was used for furniture carpentry, carts and ploughs and also for buildings used as shelters in the former Cochinchina, present-day Vietnam.

⁵³⁵ *Shorea robusta* Gaertn. See Fèvre and Métailié (2005, p. 438), according to Soothill and Hodous (1969, p. 242); Kitamura Shiro (1963, p. 366, fig. p. 367).

⁵³⁶ *Artocarpus heterophyllus* Lam.

from Western areas.⁵³⁷ One may wonder what were the motives of the heads of these monasteries when they made these acquisitions. Clearly, a vegetarian diet must have encouraged them to try to increase the resources that could be provided by their kitchen gardens and their orchards. For example, Duan Chengshi tells us that a new variety of aubergine of a whitish colour shaped like a hen's egg, originally from Fujian, was to be found in the Xi Ming Si 西明寺, the famous monastery in Chang'an that was a centre of translations from Sanskrit texts.⁵³⁸ The consumption of tea by the monks led to the spread of tea plantations. An interest in flowering plants and rare exotic fruits that could be used as offerings is also understandable. And, finally, the many plantations of fruit-bearing trees or trees providing wood for building suggest that the monasteries also sold their produce. One example is provided by the thousand jujube trees of the Kai Yi Si 開義寺 monastery at Bingzhou, planted during the Sui dynasty; another, in the same period, by the hundreds of thousands of catalpas that belonged to a monastery in the mountains of Haiyu 海虞山, in present-day southern Jiangsu.⁵³⁹

Descriptions of gardens, even of a partial nature, are rare in the Tang period, but that is not the case under the Song dynasty. One town, Luoyang, played a particularly remarkable role in this respect. It had been an ancient capital and, as such, had retained its prestige. Moreover, it was situated no more than 160 kilometres from the new capital, Kaifeng. It was an important centre for the cultivation of flowers and was famous for its peonies, both shrubs and herbaceous. A number of monographs have been written about them and can be found in an earlier volume,⁵⁴⁰ but at this point two more general texts will give us some idea of the importance of the plants, particularly the ornamental ones, and of the gardens in the town, which reflect an interest that was widely shared in this period. In the first work, *Luoyang hua mu ji* 洛陽花木記 (Notes on the Trees and Flowers of Luoyang), the author, Zhou Shihou 周師厚, lists the plants that he has found in the gardens of the town, while in the second, *Luoyang ming yuan ji* 洛陽明園記 (Notes on the Famous Gardens of Luoyang), the author, Li Gefei 李格非, describes the most famous of the gardens.

Zhou Shihou 周師厚,⁵⁴¹ personal name Dunfu 敦夫, was a native of Yinxian 鄆縣, nowadays the city of Zhejiang. He passed the imperial examinations and became *jìn shi* in the Huang You period 皇祐 (+1049–1053). He states that he visited the famous gardens of Luoyang for the first time during the Xi Ning 熙寧

⁵³⁷ Xie Chongguang (1989, p. 2). A jackfruit plant was introduced in 502 and cultivated in the Kai Yuan monastery in Canton, and the fruits of this unique tree were reserved for offerings. It was not until the Yuan dynasty that it spread to Hainan, where it was cultivated in other monasteries; finally, during the Ming dynasty, it gradually spread to southern coast of the island and then to Yunnan, Guangxi and Guangdong. See Mo Qinghua (1985, p. 263).

⁵³⁸ Cited by Xie Chongguang (1989, p. 2). ⁵³⁹ See Xie Chongguang (1989, p. 6).

⁵⁴⁰ See SCC (Volume 6, Part 1, pp. 394–409).

⁵⁴¹ Some editions of this text give Zhou Xu 周敘 as the name of the author. The choice of Zhou Shihou is based on Wang Yuhu (1979) and Fang Binguan et al. (1933, p. 534). Zhou Xu was a man who lived under the Ming; see Fang Binguan et al. (1933, p. 536).

period (+1068–1077) and that he returned to the town in 1082, as an official. His passion for flowers led him to visit the gardens in his free time. In his preface, he admits that he did not manage to visit more than one-tenth of them and eventually was able to see only half of the extraordinary flowers. Those remarks of his, though, must be purely rhetorical, as what he does transmit to us is remarkably rich. He gives the names of some 530 kinds of flower, which he presents according to his own personal classification. He cites successively: peony shrubs (*mu dan* 牡丹), herbaceous peonies (*shao yao* 芍藥), various flowers (*za hua* 雜花), flowers of fruit trees (*guo zi hua* 果子花), flowers from spiny plants (*ci hua* 刺花), flowers of herbaceous plants (*cao hua* 草花), aquatic flowers (*shui hua* 水花), and the flowers of climbing plants (*man hua* 蔓花). These simple lists are richly informative. In the first place, we may assume that they reflect a general appreciation, if not in particular that of the author, and, thanks to their precision, they confirm the importance of certain plants. For example, if we consider the shrub peonies, in his treatise of +1034, *Luoyang mu dan ji* 洛陽牡丹記, Ouyang Xiu 歐陽修 had mentioned twenty-two kinds; fifty years later, Zhou Shihou names 109! He divides them up according to the structure and colour of the flowers. Leaving aside single flowers, he concentrates solely on double flowers (literally ‘with a thousand leaves’,⁵⁴² *qian ye* 千葉), and semi-double flowers (literally ‘with many leaves’, *duo ye* 多葉), in which the transformation of stamens into pseudo-petals is incomplete. Those that are most highly appreciated are put in the following order: ‘double yellow flower’ (*qian ye huang hua* 千葉黃花) (ten kinds), ‘double red flower’ (*qian ye hong hua* 千葉紅花) (thirty-four kinds), ‘double purple flower’ (*qian ye zi hua* 千葉紫花) (ten kinds), ‘double pale red flower’ (*qian ye fei hua* 千葉緋花) (one), ‘double white flower’ (*qian ye bai hua* 千葉白花) (four). Next, he cites the names of thirty-two kinds of semi-double red flowers, followed by fourteen purple ones, three yellow ones and finally one semi-double white one. For the herbaceous peonies (*shao yao*) he again mentions only double-flowering varieties, forty-one in all, sixteen of which have yellow flowers, sixteen have red flowers, six have purple flowers, two have white flowers and one has a pale red flower. The eighty-two names in the following category of ‘various flowers’, presented with no further divisions, refer to fifty or so botanical species. Some are trees, others shrubs. The list that follows is not complete as certain names are impossible to identify. The first to be cited are two kinds of fragrant daphne (*rui xian* 瑞香);⁵⁴³ six kinds of Chinese flowering apple (*hai tang* 海棠);⁵⁴⁴ three Japanese apricots (*mei* 梅);⁵⁴⁵ one wintersweet (*la mei* 臘梅);⁵⁴⁶ one thorny cane-apple (*hai shi liu* 海石榴);⁵⁴⁷ one elder tree (*zhen zhu hua* 真珠花);⁵⁴⁸ three kinds of *Weigelia* (*jin dai hua* 錦帶花);⁵⁴⁹ one

⁵⁴² We should remember that in European languages the notion of a ‘petal’, distinct from a ‘leaf’, did not appear until the 18th century.

⁵⁴³ *Daphne odora* Thunb.

⁵⁴⁴ *Malus spectabilis* Borkh.

⁵⁴⁵ *Prunus mume* Sieb. et Zucc.

⁵⁴⁶ *Chimonanthus praecox* K. Koch.

⁵⁴⁷ In the *Zhi pin*, Zhao Han points out that despite the name, this is not a pomegranate tree but a *ci mei* 刺梅, the spiny leaves of which resemble those of roses and which produces small rounded flat fruits, yellow in colour, which remind one of pomegranates. *Ci mei* is a cultivar of *Myrica rubra* Sieb. et Zucc., of the *typica* variety.

⁵⁴⁸ *Sambucus sinensis* Lindl. Cf Gao Minggan (2006, p. 298).

⁵⁴⁹ *Weigelia florida* (Bunge) A. DC.

Xanthoceras (*wen guan hua* 文冠花),⁵⁵⁰ three kinds of 'cypress-dragon' (*long bai* 龍柏);⁵⁵¹ four kinds of camellia (*shan cha* 山茶); two kinds of Japanese rose; Japanese globe-flower (*di tang* 棣棠)⁵⁵² with single flowers and with double flowers; three kinds of Chinese bushcherry (*yu li* 郁李);⁵⁵³ two cherries (*ying tao*); the wild peach (*shan tao*); two kinds of quince tree (*mu gua*);⁵⁵⁴ three kinds of crape myrtle (*wei* 薇) with red, pale red and purple flowers;⁵⁵⁵ one kind of cynanchum (*shi lan* 石藍);⁵⁵⁶ osmanthus (sweet olive) (*mu xi* 木樨);⁵⁵⁷ three species of magnolia (*xin yi* 辛夷);⁵⁵⁸ *mu lan* 木蘭⁵⁵⁹ and *mu bi* 木筆;⁵⁶⁰ Chinese redbud (*zi jing* 紫荊);⁵⁶¹ one 'nephrite' flower (*qiong hua* 瓊花);⁵⁶² the oroxylum (*yu hu die* 玉蝴蝶);⁵⁶³ the common hydrangea (*ba xian hua* 八仙花);⁵⁶⁴ two kinds of *Syringa* (*ding xiang hua* 丁香花⁵⁶⁵ and *bai jie hua* 百結花);⁵⁶⁶ winter jasmine (*ying chun hua* 迎春花);⁵⁶⁷ two kinds of azalea, one with red flowers (*ying shan hong* 映山紅)⁵⁶⁸ and the other 'powder red' (*fen hong zhi zhu* 粉紅躑躅); the Japanese glorybower (*cheng tong* 頰桐);⁵⁶⁹ two kinds of quince,⁵⁷⁰ one with red flowers (*hong mu li* 紅木梨) and the other with double flowers (*qian ye mu li* 千葉木梨); three kinds of cotton rose (*fu rong*) one of which has double flowers and the other yellow flowers; one kind of China rose with double flowers (*qian ye zhu jin* 千葉朱槿);⁵⁷¹ two species of jasmine, Arabian jasmine (*mo li hua* 抹厲花)⁵⁷² and Spanish jasmine (*su xin hua* 素馨花);⁵⁷³ one other kind of China rose (*fo sang hua* 佛桑花);⁵⁷⁴ the Chinese magnolia (*ye he hua* 夜合花);⁵⁷⁵ one tamarisk (*cheng liu* 檉柳);⁵⁷⁶ one banana tree (*hong jiao* 紅蕉);⁵⁷⁷ the golden bell (*lian qiao hua* 連翹花);⁵⁷⁸ one honeysuckle (*lu si er hua* 鷺鷥兒花);⁵⁷⁹ and about twenty-four others, the names of which I have been unable to identify.

The names of the plants in the category of 'flowers of fruit trees' or 'fruit-flowers' are divided between ten main entries: peach trees, Japanese apricot trees, apricot trees, pear trees, plum trees, cherry trees, pomegranate trees, apple trees, quince trees and other apple trees. A list of the names of thirty-two cultivars of peach trees (*tao*) follows,⁵⁸⁰ then six cultivars of the Japanese apricot (*mei*); sixteen of the apricot tree (*xing*), one of which is the ginkgo, 'silver apricot tree' (*yin xing*); twenty-seven of the pear tree (*li* 梨);⁵⁸¹ twenty-six of the plum tree (*li* 李);⁵⁸² ten of the cherry tree

⁵⁵⁰ *Xanthoceras sorbifolia* Bunge. ⁵⁵¹ See note 497, this chapter. ⁵⁵² *Kerria japonica* (L.) DC.

⁵⁵³ *Prunus japonica* Thunb. (= *Cerasus japonica* (Thunb.) Lois.). ⁵⁵⁴ *Chenomeles sinensis* (Thouin) Koehne.

⁵⁵⁵ *Lagerstroemia indica* L. ⁵⁵⁶ *Cynanchum* sp. Cf Gao Minggan (2006, p. 90). ⁵⁵⁷ *Osmanthus fragrans* Lour.

⁵⁵⁸ *Magnolia liliflora* Desr. ⁵⁵⁹ *Magnolia denudata* Desr. ⁵⁶⁰ *Magnolia amoena* Cheng.

⁵⁶¹ *Cercis chinensis* Bunge.

⁵⁶² On the history of this plant 'of the category of hydrangeas', according to a note by Zhou Shihou, and presumed to be lost, see Li Hui Lin (1959, pp. 103–8) and SCC Volume 6, Part 1, pp. 431–3).

⁵⁶³ *Oroxylum indicum* (L.) Vent. (= *Bignonia indica* L.). ⁵⁶⁴ *Hydrangea macrophylla* (Thunb.) Seringe.

⁵⁶⁵ *Syringa* spp. ⁵⁶⁶ *Syringa oblata* Lindl. Cf Gao Minggan (2006, p. 122). ⁵⁶⁷ *Jasminum nudiflorum* Lindl.

⁵⁶⁸ *Rhododendron simsii* Planch. ⁵⁶⁹ Cf note 516, this chapter. ⁵⁷⁰ *Cydonia oblonga* Mill.

⁵⁷¹ *Hibiscus rosa-sinensis* L. ⁵⁷² *Jasminum sambac* (L.) Ait.

⁵⁷³ *Jasminum officinale* L. var. *grandiflorum* (L.) Kobuski. ⁵⁷⁴ *Hibiscus rosa-sinensis* L.

⁵⁷⁵ *Magnolia coco* (Lour.) DC. (= *Magnolia pumila* Andr.). ⁵⁷⁶ *Tamarix* sp.

⁵⁷⁷ *Musa uranoscopus* Lour. (= *Musa coccinea* Andrews). ⁵⁷⁸ *Forsythia suspensa* (Thunb.) Vahl. ⁵⁷⁹ *Lonicera* sp.

⁵⁸⁰ *Prunus persica* (L.) Batsch.

⁵⁸¹ Given the richness of species of the *Pyrus* genus in China (Yu Dejun (1982) records fourteen and Kong Xu (1987) sixteen), some of the names cited must designate botanical species.

⁵⁸² *Prunus salicina* Lindl.

(*ying tao*);⁵⁸³ nine of the pomegranate tree (*shi liu*); six of the apple tree (*lin qin* 林檎); five of the quince tree (*mu gua* 木瓜); and ten of the apple tree (*nai* 奈).⁵⁸⁴

Among the thirty-seven names of the flowers with thorns that are cited, one recognises six varieties of Japanese rose (*qiang wei* 薔薇);⁵⁸⁵ three of the China rose (*yue ji* 月季);⁵⁸⁶ three of brambles (*tu mi* 荼靡),⁵⁸⁷ one of which has double flowers⁵⁸⁸ and one of which is 'golden' (*jin tu mi* 金荼靡); three 'hedgerow roses' (?) (*mei gui* 玫瑰);⁵⁸⁹ four varieties of the rose bush (*bao xiang* 寶相);⁵⁹⁰ the Banks rose (*mu xiang hua* 木香花);⁵⁹¹ two varieties of the *Catharanthus* (*chang chun hua* 長春花);⁵⁹² and two of the sasanquas (*cha mei* 茶梅).⁵⁹³

The 'flowers of grasses', *cao hua*, comprise eighty-nine kinds, including three *Cymbidium* orchids (*lan* 蘭); the narcissus (*shui xian hua* 水仙花); twenty-four kinds of chrysanthemum (*ju* 菊); eight kinds of *Hemerocallis* (*xuan cao* 萱草);⁵⁹⁴ six kinds of 'golden lantern' (*jin deng* 金燈);⁵⁹⁵ two pinks, the Chinese pink (*shi zhu hua* 石竹花)⁵⁹⁶ and the 'goose down pink' (*e mao shi zhu* 鵝毛石竹); the opium poppy (*yu mi hua* 御米花); two kinds of corn poppy (*li chun* 麗春),⁵⁹⁷ one of which has yellow flowers; the garden balsam (*jin feng xian* 金鳳花);⁵⁹⁸ the fragrant plantain lily (*yu zan hua* 玉簪花);⁵⁹⁹ three kinds of datura (*man tuo luo* 曼陀羅), five kinds of common cockscomb (*ji guan hua* 雞冠花);⁶⁰⁰ the daphne lilac (*yuan hua* 芫花);⁶⁰¹ eight kinds of hollyhock (*shu kui* 蜀葵);⁶⁰² three kinds of prince's feather (*shui hong* 水紅);⁶⁰³ two kinds of star lily (*shan dan* 山丹);⁶⁰⁴ the Chinese globe flower (*jin lian hua* 金蓮花);⁶⁰⁵ *Adenophora* (*bi yu zhan* 碧玉盞);⁶⁰⁶ and the star lily *hong bai he* 紅百合.⁶⁰⁷

Among the seventeen aquatic plants, there are six kinds of lotus (*lian* 蓮), one *Nymphoides* (*cao zing* 草荇),⁶⁰⁸ prince's feather (*shui hong* 水紅)⁶⁰⁹ and nine other plants that are named but not identifiable.

Climbing plants make up the smallest group, with only six plants, one of which is the Chinese trumpet-creeper (*ling xiao* 凌霄),⁶¹⁰ another the morning glory (*qian niu hua* 牽牛花),⁶¹¹ the four other names being impossible to identify.

Having completed this long – and incomplete – listing, one notices that personal observation and, no doubt, the dominant tastes of the period have led the author to categorise all the plants that he has observed according to criteria that are mainly aesthetic and are very different from those of, for instance, works of *materia medica*. One category is particularly interesting, that of the *guo zi hua*, 'fruit-flowers'.

⁵⁸³ *Prunus pseudo-cerasus* Lindl. ⁵⁸⁴ *Malus prunifolia* (Willd.) Borkh. (Yu 1979, p. 102).

⁵⁸⁵ *Rosa multiflora* Thunb. ⁵⁸⁶ *Rosa chinensis* Jacq. ⁵⁸⁷ *Rubus rosaefolius* Smith.

⁵⁸⁸ *Rubus rosaefolius* Smith var. *coronarius* (Sims.) Focke. ⁵⁸⁹ *Rosa rugosa* Thunb. ⁵⁹⁰ *Rosa* sp.

⁵⁹¹ *Rosa banksiae* Aiton. ⁵⁹² *Catharanthus roseus* (L.) G. Don. ⁵⁹³ *Camellia sasanqua* Thunb.

⁵⁹⁴ *Hemerocallis* sp. ⁵⁹⁵ *Lycoris radiata* (L'Hérit.) Herb. ⁵⁹⁶ *Dianthus chinensis* L. ⁵⁹⁷ *Papaver rhoeas* L.

⁵⁹⁸ *Impatiens balsamina* L. ⁵⁹⁹ *Hosta plantaginea* (Lam.) Aschers. ⁶⁰⁰ *Celosia cristata* L.

⁶⁰¹ *Daphne genkwa* Sieb. et Zucc. ⁶⁰² *Althea rosea* (L.) Cavan. ⁶⁰³ *Polygonum orientale* L.

⁶⁰⁴ *Lilium concolor* Salisb. ⁶⁰⁵ *Trollius chinensis* Bunge.

⁶⁰⁶ *Adenophora brachelioides* Maxim. It is synonymous with *ji ni* 薺芑. ⁶⁰⁷ *Lilium concolor* Salisb.

⁶⁰⁸ *Nymphoides peltatum* (Gmel.) O. Ktze.

⁶⁰⁹ It may seem strange to find this plant present in two categories, but *Polygonum orientale* is both a herbaceous plant with fine flowers and also lives in damp places.

⁶¹⁰ *Campsis grandiflora* (Thunb.) Loisel. ⁶¹¹ *Pharbitis nil* (L.) Choisy (= *Convolvulus nil* L.).

It testifies to an aesthetic interest tempered by economic considerations for, among the many varieties cited, there are none with double flowers, whereas that criterion is particularly valued in the cases of plants with fruits that are of no particular interest, such as peonies, where the only plants that are taken into consideration are precisely the varieties with double flowers. This clearly shows that these pleasure gardens could also be places designed to produce fruits. Some gardens that covered large areas and contained many trees that flowered and then produced fruit must have produced abundant harvests.⁶¹² It is interesting to note that this text also testifies to an evolution in folk classification that moves toward drawing greater distinction between generic terms in the cases of certain taxa. For instance, *ying tao* now no longer belongs to the *tao* (peach trees) but is clearly distinguished and functions in the language as a basic term to name certain varieties of cherry tree. Yet the ginkgo is not singled out and still appears as a kind of apricot tree (*xing*), the 'silver apricot' (*yin xing* 銀杏). Another interesting point is that the last cultivar of the thirty kinds of peach tree, *guang tao* 光桃, 'the shining peach tree', is described as 'without down', *wu mao* 無毛, which suggests that it is a nectarine of some kind, although a degree of doubt remains since there is no indication whether or not a stone lies within the fruit. Zhou Shihou was not content simply to draw up this list of plants that he considered to be remarkable, for later in the text he produces details and technical advice relating to their cultivation.⁶¹³ It seems to me that, as this treatise stands, it may be considered a veritable horticultural work exclusively devoted to ornamental plants. It was produced more than five centuries earlier than the *De Florum Cultura* (1633) by Giovanni Battista Ferrari (1583–1655), described as 'the first book ever to be devoted to the cultivation of flowers for solely ornamental and horticultural purposes'.⁶¹⁴ To make that statement more accurate, all that would be necessary would be to add the words 'in Europe'.

Now that we have some idea of the richness of the resources that gardeners had at their disposal, thanks to the second memoir cited above we can begin to appreciate the setting in which they operated.

In *Luoyang ming yuan ji* 洛陽名園記 (Notes on the Famous Gardens of Luoyang), the author, Li Gefei 李格非, provided a brief description of the outstanding features of nineteen of the town's famous gardens at the time of their greatest splendour. Li Gefei, personal name Wenshu 文叔, was born in Jinan, in Shandong province. This text that he wrote some time after 1039 was not published until one century later, its preface being dated the eighth year of the reign of Shao Xing (1139). In the meantime the town had been laid waste by the Jürchen, who, in 1115, had created the Jin empire. In 1125, they attacked the Song empire and were victorious; the following year they captured Kaifeng, the capital, and took the emperor Hui Zong prisoner. His dynasty had only survived by abandoning

⁶¹² On the economic aspect of the Chinese pleasure gardens under the Ming dynasty, see Clunas (1996).

⁶¹³ See his contribution to the subject of grafting, pp. 508–11 below. ⁶¹⁴ Freedberg (2002, p. 38).

northern China and establishing itself in Hangzhou.⁶¹⁵ So at the time of their publication these 'notes' were already simply an evocation of a long-gone past and a magnificence now wiped out.

Even though each garden is considered from a different point of view – with Li Gefei emphasising the features that he considers particularly interesting in each one – a few common characteristics do emerge. These gardens must have been remarkably large, for that of Sima Guang, with an area of over one hectare, is called 'small, and cannot compete with the others'. Li Gefei often cites the names of the various pavilions, terraces and ponds, which reminds us of the crucial importance of names for the Confucian literati.⁶¹⁶ He also mentions the origin of one famous garden that dated from the Tang dynasty. Then, acting as a veritable guide, he draws attention to the importance of the choice of sites which offered the best views not only *of* the gardens but also *from* the gardens. In some cases, he even suggests a precise itinerary to be followed in order to get the best out of a visit. Generally, he gives the reader an approximate idea of the place, indicating its main structure, its pools, buildings, terraces, and planted areas, such as the bamboo plantations that were used to create special effects of streams and grottos. In other cases, the author concentrates on very precise details. For example, in the Western Garden of Mr Dong, Dong Shi xi yuan 董氏西園, he notes that water emerges from the petals of a fountain carved from stone in the shape of a lotus, situated at the heart of a grove of bamboos. In most cases, the plants are mentioned in a general manner using terms such as *hua mu* 花木, 'flowers and trees', or *zhu mu* 竹木, 'bamboos and trees'. If a precise name is given, it is for a particular reason. Still in the Western Garden of Mr Dong, he mentions a spectacular juniper tree (*gui* 檜) with a circumference that it takes a chain of six arms to contain, which produced fruits as tiny as pine nuts but sweeter and more fragrant. He describes the alignments of pines and juniper trees in the garden of Mr Liu, Liu Shi yuan 劉氏園, and of *Paulownias*, catalpas and savines in the Garden of United Spring Times, Cong chun yuan 叢春園. The most spectacular for its flowers is the Garden of Peonies in the Garden of the Heavenly Emperor, Tian Wang yuan hua yuan zi 天王園花園子. He writes as follows:

Many flowers are cultivated in Luoyang but one in particular is simply called *hua* 花, ['the flower']; it is the shrub peony (*mu dan* 牡丹). Peonies are cultivated in all the gardens, but only one is called the Garden of Peonies (*Hua yuan zi*). In truth, there are no constructions, no ponds, but only peonies, several hundreds of thousands of them. When they flower, the whole town is there. The two most popular varieties are the 'Yao Yellow' and the 'Wei Purple'. The price of the latter is one hundred ounces of silver; as for the 'Yao Yellow', not a single one is for sale.

⁶¹⁵ On life in this new capital, see Gernet (1959).

⁶¹⁶ The correct naming of the various sites constructed in the gardens was considered an important matter. On this subject, see Harrist (1993), Makeham (1998), Wu Xin (2005). See also Account xviii in the *Hong lou meng* in which this is a central theme. See Cao Xueqin (1981, pp. 388–413).

Whatever can this extraordinary flower have been like? Here is the description provided by Zhou Shihou:

A double yellow flower. Very bright colour. A deep purple heart. When open, it may measure as much as eight or nine inches. This flower comes from the property of Mr Yao, on the Ba si ma hill, at the foot of the Beimang mountains. Nowadays it is multiplied by grafting in the famous gardens of Luoyang. To the north of the Huai, although there are many of them, the flowers are double or single depending on the year. To the south of this river, even if the flowers are always double they do not bear comparison with those to the north. The reason is the fact that, since it originally comes from a mountain, it is adapted to altitude. Close to towns, the soil is too rich and does not suit its nature. It flowers late when all the other flowers have already withered. It has a very beautiful colour and also a very pure nature. When it opens up it is different from all the rest. That is why the inhabitants of Luoyang call it 'the emperor of flowers'. Only three buds flower each year.

It is not surprising, as we are told in the monograph entitled *Notes on the Tree Peonies of Luoyang* (*Luoyang mu dan ji* 洛陽牡丹記) by Ouyang Xiu 歐陽修 (+1007–1072), that each year, a few rare branches of this, the most highly appreciated variety, on the point of flowering, were first carefully arranged in lengths of bamboo strewn with freshly cut cabbage leaves, and their stems were then sealed with wax. They were then sent off to reach the capital in the space of one or two days, thanks to postal relays, in order to be offered to the emperor.⁶¹⁷ This garden of peonies was open to the inhabitants of Luoyang just as, it would seem, were others, probably organised in a variety of ways.

Li Gefei also provides a very brief description of the Garden of Confidence in Humanity, Gui Ren Yuan 歸仁園, which, he claims, is the very best when compared to the many other great gardens of the region. In the northern part, there are thousands of peony plants (*mu dan* and *shao yao*); in the central area there are over one hundred *mu* (over six hectares) of bamboos; in the south, peach trees and plum trees stretch as far as the eye can see.

The description of the Garden of Humanity and Prosperity of Mr Li, Li Shi ren feng yuan 李氏任豐園, throws light upon other particular features. Not only are the buildings pure marvels, but the collection of plants is enriched by rare specimens every year. There are dozens of varieties of peach tree, plum tree, Japanese apricot tree, lotus and chrysanthemum, and more than a hundred kinds of peony of both the shrub and the herbaceous variety. There are also plants that come from distant places, such as 'the bletilla hyacinth' (*zi lan* 紫蘭),⁶¹⁸ the Arabian jasmine (*mo li* 茉莉), the 'nephrite flower' (*qiong hua* 瓊花)⁶¹⁹ and the camellia (*shan cha* 山茶). He claims that, being 'particularly hard to cultivate, these cannot grow anywhere except in Luoyang', which was reputed to benefit from altogether exceptional pedological conditions. That remark follows an earlier one by Li Gefei who writes

⁶¹⁷ See Li Hui-Lin (1959, 22–36); also Needham and Lu (1986, 394–9). On the history of the post relays, see Gazagnadou (1994).

⁶¹⁸ *Bletilla striata* (Thunb.) Reichb.

⁶¹⁹ See note 562, this chapter.

that, thanks to the extraordinary talent of exceptional grafters – who, in grafting, could rival the very process of creation (*zao hua* 造化) – the number of extraordinary successes had been constantly increasing, compared to the one hundred plants mentioned by Li Deyu in his *Ping yuan hua mu ji*.

The Island of Pines, Song Dao 松島, was, as its name suggests, a garden devoted to pines (*song* 松). Commenting on it, Li Gefei remarks that in Luoyang, despite the beauty of the pines, cypresses, thuyas, *Cunninghamias* and juniper trees, the last of those are the ones loved best while the pines are the most venerated, hence the name of this garden of age-old trees, in the south-eastern part of which was a pine tree with an extraordinary double trunk. He adds that bamboos and other trees were also planted there, but gives no details about them. However, he does mention that the present proprietor is the third since the creation of the garden under the Tang. Finally, he states that in two of the nineteen gardens that he mentions in his collection, there is a ‘garden of medicinal herbs’ (*yao pu* 藥圃), as there also is in the garden of Sima Guang, which will now be considered in more detail.

Sima Guang 司馬光 (+1019–86), personal name Junshi 君實, a native of Xia 夏 in Hunan province, obtained the title of *jìn shi* in 1038. He was a well-known historian⁶²⁰ and a former first minister, and he left us an essay entitled *Du le yuan ji* 獨樂園記⁶²¹ (A Note on the Garden of My Delight⁶²²). The garden was situated on a piece of land of about two acres (twenty *mu*) that he had bought in Luoyang in 1073, after retiring from his post as a minister of state in 1070. The central element in this garden, and the one described first, was the Reading Room Du Shu Tang 讀書堂, which housed his rich library. To the south, the water that fed an ornamental lake ran out northwards. The arrangement of the garden was determined by considerations both practical and aesthetic. To the north of the Reading Room there was another lake with a small central island planted with a perfectly circular grove of bamboos six yards in diameter that was reminiscent of a fisherman’s refuge and so was known as Diao Yu An 釣魚庵, the Line-Fisherman’s Cabin. To the north of this lake, there was a long building with five bays constructed as a shelter from the sun; the apertures were designed to circulate a stream of air, and in front bamboos were planted to freshen the atmosphere. This was Zhong Zhu Zhai 種竹齋, the Pavilion for Planting Bamboos. Here is Sima Guang’s description of it:

To the east of the ornamental lake, I have had the ground arranged into 120 beds for planting out suitable medicinal plants; once they have been identified, I separate them out. To the north of these strips, on a square of land that suggests a Go chequer-board with sides two yards long, I have planted bamboos that suggest a pavilion, with intertwined overarching branches. In front, enclosed by other bamboos interlaced with medicinal lianas, runs a path that resembles a covered gallery. All around it, by way of walls, are medicinal trees: I call this Cai Yao Pu 採藥圃 (the Garden for Gathering Simples). To the

⁶²⁰ He was also the author of a great history of China, *Zi zhi tong jian* 資治通鑑, completed in 1084.

⁶²¹ See *Si ku quan shu* 四庫全書; Chen Zhi (1983, pp. 24–8). This text was adapted in French three times in the course of the 18th century. See pp. 645–7 below.

⁶²² Translations of the names of the various sites in this garden are also given in Harist (1993).

south of this garden there are six enclosures, two for herbaceous peonies [*Paeonia albiflora* Pall. *Shaoyao*], two for shrub peonies [*Paeonia suffruticosa* Andr. (= *P. moutan* Sims., *mudan*)] and two for various other flowers, with no more than two plants of each (Fig. 169); that suffices for knowing their names and characteristics, so I do not need any more of them. To the north of these enclosures, there is a pavilion known as Jiao Hua Ting 澆花亭 (Pavilion for Watering the Flowers). The town of Luoyang is not far from the mountains, but because of the forest, unfortunately one cannot always see them, so I raised a terrace in the middle of the garden, with a shelter, from which I can see the Wan'an and Xuanyuan mountains in the distance; this is Jian Shan Tai 見山臺 (Terrace for Seeing the Mountain). The Old Fogey [that I am] spends most of his time reading in his library. With the Sages [of antiquity] for masters and talented people for friends, he can catch glimpses of the source of goodness and justice, and he examines the origins of rites and music. Beginning from a time before things took shape and progressing to beyond infinity, the principle of all things appears before my eyes. What distresses me is that this is a quest without end; what more can I ask from others and what can I expect from outside? When I am weary and tired, I take my rod and go fishing; I hitch up my tunic and go off to gather simples; I open the sluice gates of the channels in order to water the flowers [or else], seizing an axe, I strip bamboos. Then I wipe away the sweat and wash my hands; now I position myself on the promontory, my gaze sweeping the horizon, free from all constraint, strolling around, doing just as I please. On moonlit nights or when there is a cool breeze, I wander at will and stop when it suits me, entirely free from my body, resolutely alone and so very relaxed. I cannot imagine any greater pleasure, on Earth or in Heaven . . . For all these reasons, I have named my garden 'Garden of My Delight'.

This description leaves one with the impression that this was a place created to offer all the conditions favourable to study and meditation. Certainly, the first element named, at the very heart of this garden, is the library where books representing 5,000 *juan* have been assembled. It is also a place for leisure recreation where the author can relax as he admires the borrowed landscape of the mountains in the distance, beyond the city walls, and undertakes light recreational tasks. The plants in the garden fulfil two functions, the one aesthetic, the other practical. The bamboos, very much present, have a structuring role. Massed together, they simulate various buildings and paths, creating currents of fresh air in the summer, thanks to the clever manner in which they are arranged in front of a building. Medicinal lianas, intermingling with the bamboos, reinforce and complete the desired impression of plant corridors. Medicinal plants other than those lianas and the trees are very important, for they occupy some 120 patches in which they are arranged according to a strict order which is not actually described but can be imagined thanks to the examples provided by the classification of *materia medica* in the *ben cao* of the Song period. These associate on the one hand the three *san pin* grades and, on the other, the five categories of plant: grasses (*cao*), trees (*mu*), fruits (*guo*), grains (*mi gu*) and vegetables (*cai*). In this precise case, only the grasses, wild plants in the classification of the *ben cao*, are involved – or, at least, so it would appear, given that there are no references to cultivated food-producing plants and that ornamental plants are treated quite differently. These are grown in groups in



Fig. 169. Detail from 'The Garden for Self-Enjoyment', 1515–52. Qiu Ying (c.1494–1552). Handscroll, ink and slight colour on silk; 27.8 × 381.0 cm. The Cleveland Museum of Art, John L. Severance Fund, 1978.67.

six beds, four of which are for species of peony (two of each) and two for all the rest, each species or variety being represented by no more than two plants. On the other hand, simples receive particular attention, for they provide Sima Guang with a continuing field of research and possibly also a source of income. It is impossible not to note that the attitude to plants is definitely determined by their nature. Where medicinal plants are concerned, trees and lianas have a secondary function in that they serve to structure certain parts of the garden, whereas the medicinal herbs, strictly arranged in 120 beds, are objects of study. No aesthetic interest is shown in ornamental plants, only two plants of each of which are grown in the six flowerbeds. The difference in the ways in which the plants are treated tellingly illuminates the interests of the author. It is quite clear that the whole area of the 120 beds of medicinal plants plus the six beds of ornamental plants form a veritable little 'botanical school', in every way comparable in its layout to part of a 'medical garden' of the European Renaissance, such as, the *hortus medicus* of the University of Leiden as organised by Charles de l'Écluse (Carolus Clusius) (1526–1609) from 1592 onward.⁶²³ The motives of Sima Guang stand in stark contrast to those of a man such as Li Deyu. The plants that interest Sima Guang are primarily those that stimulate his taste for study and observation. His remarks certainly confirm the importance of research into correct names (*zheng ming* 正名). He makes it quite clear that the reason why he keeps only two shoots of each ornamental plant is that he has no need for any more once he has discovered their names. What a contrast to most of the other gardens contemporary with his in the very same town of Luoyang, to which Li Gefei devotes one paragraph. As for medicinal plants, for Sima Guang observation means even more, for it leads him to set in place, in specially selected beds, plants for him to study and observe. We can detect in this treatment of wild plants a means of 'developing one's knowledge by scrutinising the nature of things', in fact an implementation of the Confucian urge that is given expression at the very beginning of the Great Study (*Da xue*).⁶²⁴ Interest in a garden may also include a desire to have permanently before one's eyes objects that are to be observed. One result of such a minute observation of plants, in this case simply of a single species, and for moral reasons, which is a fundamental aspect of 'the investigation of things', is revealed by an illustrated book published in 1231. Under the title of *Portraits of the Japanese Apricot Tree*, *Mei hua xi shen pu* 梅花喜神譜, the author, Song Boren 宋伯仁, tracks, in a series of 100 images, the evolution of the flowers of a Japanese apricot tree (*mei* 梅),⁶²⁵ from the appearance of a bud on the branch to the falling of the very last petal.

⁶²³ Tjon Sie Fat (1991, p. 3). See illustrations 2 (p. 4), 4 (p. 6) and 5 (p. 9).

⁶²⁴ The fourth paragraph of the beginning of this fundamental text of Confucianism ends with *Zhi zhi zai ge wu* 致知在各物. The classic translations of Legge (1969, p. 6) and Couvreur (1949, p. 4) are well known: Legge: 'such extension of knowledge lay in the investigation of things'; Couvreur: 'On développe ses connaissances en scrutant la nature des choses' ('One develops one's knowledge by scrutinising the nature of things'). Sima Guang wrote an essay on this very point, in 1084: Essay on *Zhi zhi zai ge wu* (Sima Guang, Sima Wen Gong Ji, in *Si bu bei yao*, Chapter 13, 6b–7a).

⁶²⁵ *Prunus mume* Sieb. et Zucc.



Fig. 170. *Mi jiao* 麋角, 'staghorn', from *Mei hua xi shen pu* (1231, *juan shang*, 24a) by Song Boren. See also Fig. 29 above.

However, this extremely aesthetic phenological approach to one of the flowers most cherished by the literati seems also to be a means of introducing a particular line of thought. Each of the 100 images is accompanied by a brief quatrain that expresses a state of mind, a remark or perhaps a sentiment that recalls the emotion felt at the sight of the flower in the particular state in which it is drawn. It is also fair to suppose that, by using this form of representation, the author is seeking to arouse a particular sentiment in his reader. The representation of a flower at one moment in its development refers one to a poem, itself an allusive echo of something else, so that this engenders in the reader, necessarily himself a scholar, a deep understanding of what the author is trying to express. For example, the first line of the poem associates the image of 'stags' antlers' (Fig. 170) with a poem in the *Shi jing*,⁶²⁶ 'The stags roar' is an allusion to the excellent relations that the emperor maintains with his ministers and with the envoys from vassal princes. Perhaps one may see this not only as an evocation of friendship but also as a reminder of the necessity for unity around the sovereign at a moment when, despite the Court's withdrawal to Hangzhou, the dynasty is still under threat from foreign armies. After a taste for plants for purely aesthetic or scientific reasons, here we also have mention of the symbolic importance that may account for the choice of them within the close-knit environment that a garden constitutes. Another criterion for classifying plants is their colour. It is according to this principle and at the same time specifying their geographical origin that, emulating Li Deyu, Hong Kuo 洪适 (1116–84) lists the beauties of the garden called Pan Zhou 盤洲, 'Plate Island', which he had created in 1167 near the family home at Boyang 波陽 to the north of present-day Jiangxi. In his *Notes on the Plate Island*, *Pan zhou ji* 盤洲記 (+1173),⁶²⁷ he distinguishes between shrubs with flowers that are white, red, yellow, lightly coloured or purple. For herbaceous

⁶²⁶ Poem no 161, Lu ming, p. 779, in Xiang Xi (1986); Couvreur (1896, p. 174).

⁶²⁷ See Hong Kuo (1983).

flowers, only pinks and cockscombs are picked out on account of the possibility of their producing flowers of different colours.⁶²⁸

A jump of several centuries returns us to Gao Lian 高濂, the scholar-aesthete, poet, composer of operas and other pieces of music, who lived in the Wan Li period (+1573–1620) in Hangzhou and whom we have considered above in connection with the horticultural aspect of his writings about plants.⁶²⁹ His *Zun sheng ba jian* 遵生八箋 (Eight Disquisitions on the Art of Living (a Retired Life)) reflects his preoccupations relating to a healthy life. This interest was directly linked to the experiences that life had brought him. Having recovered his health after a childhood marked by illness, he wished to transmit his experience through the advice that he offered in these eight essays. In them, he recommends moral rectitude, harmony with the seasons, techniques for controlling *qi*, diet, the appreciation of beautiful objects, medicinal recipes and a harmonious organisation of the framework of one's life. In this respect, the place of plants was very important to him and he thought it right to know how to appreciate them fully. So it is not surprising to find that, in addition to the parts of his book that we have considered above and that are clearly of a horticultural nature,⁶³⁰ he also writes about plants from the point of view of arranging his studio and other places that he uses for his studies: a little shelter with a thatched or palm-leaf roof, supported by four untrimmed trachycarpus trunks, not very elegant but durable, and another shelter, constructed out of four planted Chinese cypresses (*bai* 柏), between which one rigs up a roof using bundles of bamboo that jut out to form a simple lip. One can interweave shoots of osmanthus or yew (*luo han song* 羅漢松),⁶³¹ but he advises against climbing roses, which will grow too high and, once they have bloomed, will shed their leaves, attract insects, catch on one's clothing and scratch one's face with their thorns and obstruct the view. He suggests dividing flowers into three grades (*san pin*),⁶³² that have only their names in common with the grades mentioned in the *Shen nong ben cao jing*, for they define not pharmacological properties but only a classification according to aesthetic criteria. The upper category (*gao pin* 高品) contains the 'supreme flowers', the middle category (*miao pin* 妙品) is for 'marvellous flowers', the lower category (*ju pin* 具品) is for 'useful flowers'. In all, 150 plants are named, thirty or so of the 'sublime' ones, the same number of 'useful' ones and eighty 'marvellous' ones. At the top come a number of different orchids (*lan* 蘭) of the *Cymbidium* genus; next, two lilies (*shan dan* 山丹),⁶³³ one white, the other yellow; a senno campion (*jian qiu luo* 剪秋羅);⁶³⁴ a two-toned cockscomb (*er se ji guan* 二色雞冠);⁶³⁵ a garden loosestrife (*huang lian* 黃蓮);⁶³⁶ an Arabian jasmine with double

⁶²⁸ This choice puts one in mind of a similar classification by Ferrari in his treatise on the cultivation of flowers (1633). See Freedberg (2002, pp. 39–41).

⁶²⁹ See the preceding chapter. ⁶³⁰ Gao Lian (1988, pp. 563–642).

⁶³¹ *Podocarpus macrophyllus* (Thunb.) D. Don. ⁶³² Cf Gao Lian (1988, pp. 275–6).

⁶³³ *Lilium concolor* Salisb. ⁶³⁴ *Lychnis senno* Sieb. et Zucc.

⁶³⁵ A note states that in a single flower there are two colours, white and purple, and that they really are in the same flower.

⁶³⁶ *Lysimachia vulgaris* L. var. *daurica* Ledeb.

flowers (*qian ban mo li* 千瓣茉莉); a white herbaceous peony (*bai shao* 白芍); a red one with double flowers (*qian ban hong shao* 千瓣紅芍); the hedgerow rose (*mei gui* 玫瑰); a begonia (*qiu hai tang* 秋海棠);⁶³⁷ a China rose (*yue ji* 月季); a red China rose (*da hong fo sang* 紅佛桑); a lotus with double blooms (*tai lian* 臺蓮);⁶³⁸ the pink laurel flower (*jia zhu tao hua* 夾竹桃花); the narcissus with a single flower (*dan ban shui xian hua* 單瓣水仙花); the flower of a yellow *Hemerocallis* (*huang xuan hua* 黃萱花);⁶³⁹ a multiflora rose bush with yellow flowers (*huang qiang wei* 黃薔薇); various peonies, two shrubs, the one purple (*zi mu dan* 紫牡丹), the other white (*bai mu dan* 白牡丹); and four herbaceous peonies, one purple (*zi shao yao* 紫芍藥), one silvery (*yin shao yao* 銀芍藥), one golden (*jin shao yao* 金芍藥) and one 'honey-coloured' (*mi shao yao* 蜜芍藥); one golden rose (*jin bao xiang* 金寶相); the chulan tree (*yu zi lan* 魚子蘭);⁶⁴⁰ the sweet flag (*chang pu* 菖蒲);⁶⁴¹ and the flower of the Chinese magnolia (*ye he hua* 夜合花).⁶⁴² Gao Lian justifies the top place of all the flowers in this group by the modesty of both their colours and their habit, which confers upon them a discreet elegance. He goes on to say that these qualities make them suitable for planting in pots and placing on the shelves of a working desk, where one can contemplate them serenely alongside the books and a cithara. Whether it is a sign of a general evolution in tastes or simply a reflection of the author's own personal taste, peonies have lost the dominant place that they occupied in the Song period and, out of the thirty or so flowers named, only the white jasmine and one white herbaceous peony are noted as bearing double flowers. The narcissus is even picked out for having a single flower.⁶⁴³ Pride of place now goes to the *Cymbidiums*, tiny orchids with greenish flowers that grow in out-of-the-way places but emit a delicate perfume. These are the very symbol of this scholar whose renown, thanks to his writings, spread far beyond the place where he pursued his studies.

The second-rank plants have beautiful colours and agreeable perfumes, and are decorative on balustrades throughout the four seasons. They include many roses, hibiscus plants, lilacs, double-flowered narcissi, balsamine, the morning glory and so on. As for those in the last category, considered rather vulgar on account of their exuberance, they can be placed on walls and above ornamental pools, where they will make up for any dearth of flowering plants. In this category we find a St John's wort (*jin si tao* 金絲桃),⁶⁴⁴ a Chinese boxtree, the Chinese wolfberry (*gou qi hua* 枸杞花),⁶⁴⁵ a dodder (*jin teng* 金藤),⁶⁴⁶ a Nippon lily (*wan nian qing hua* 萬年青花)⁶⁴⁷ and an azalea (*yang zhi zhu* 羊躑躅).⁶⁴⁸ Gao Lian brings this chapter to a close with the following words:

⁶³⁷ *Begonia evansiana* Andr.

⁶³⁸ A note by Gao Lian states that once the flower has withered, petals emerge from every alveole of the receptacle.

⁶³⁹ *Hemerocallis flava* L.

⁶⁴⁰ *Chloranthus spicatus* (Thunb.) Makino.

⁶⁴¹ *Acorus calamus* L.

⁶⁴² *Magnolia coco* (Lour.) DC.

⁶⁴³ It is worth noting that for Gao Lian the petals are clearly differentiated from the leaves: for double flowers he uses *qian ban* 千瓣, 'a thousand petals', not *qian ye* 千葉, 'a thousand leaves'.

⁶⁴⁴ *Hypericum chinense* L.

⁶⁴⁵ *Lycium chinense* Mill.

⁶⁴⁶ *Cuscuta japonica* Choisy.

⁶⁴⁷ *Rhododendron japonica* Roth.

⁶⁴⁸ *Rhododendron molle* (Bl.) G. Don.

all the kinds of flower cited above are the product of creation and transformation; they are a source of joy for human beings, and they grow everywhere. I think that when one has planted a garden, with one's eye and heart suddenly ravished, one cannot blush at whatever the poetry of Ouyang Xiu may teach us.

A little earlier, indeed, he had cited a poem that Ouyang Xiu 歐陽修 (1007–72) had written to thank a Daoist who cultivated flowers:

Deep red and light white go well together,
One must cultivate respecting the natural order.
I wish in each of the four seasons to hold a cup in my hand
And for there never to be a day when a flower does not bloom.

It seems to be above all a love of plants and a great fund of curiosity that inspires a contemporary of Gao Lian, Zhao Han 趙頤, who was mentioned in the previous chapter.⁶⁴⁹ His *Zhi pin* 植品 (Appreciation of Plants) (author's preface 1617) is fascinating to read on account of the diversity of the subjects that he tackles. In a study of plants that seems less personal than that of Gao Lian (he does not suggest any new classification system) he includes a wealth of varied information and, above all, one senses that he is always present in his garden or close to it. In the first part, which is devoted to flowers, he mentions fifty-five kinds of plant, both herbaceous and shrubs. At the top of his list he places peony shrubs, followed by herbaceous peonies, then *Cymbidiums*, chrysanthemums, the sunflower and the tomato plant, lotuses, *Hemerocallis*, the blackberry lily (*she gan* 射干),⁶⁵⁰ the plantain lily (*yu zan*), the star lily (*shan dan*), Brown's lily, the carnation, the common cockscomb and so on. He does not suggest any classification system other than that indicated by the division of the collection into two parts, the second being devoted to flowering trees (*hua mu* 花木), with fruits and vegetables in an appendix: in all close on eighty names that constitute as many entries. What is important in these notes is the remarks that he makes on each plant. In Part 1, if he cites the sunflower after the chrysanthemums that is only on account of an association between the two names, for the sunflower is called 'the chrysanthemum that faces the sun', *xiang ri ju* 向日菊, while the tomato plant, which has the same foreign provenance as the sunflower, is cited immediately after it, but he declares that he loathes both of them, the first for an aesthetic reason (once the plants have flowered the heads all droop toward the ground and resemble wasps' nests), the latter because of the smell of its foliage. One interesting remark of his concerns the reasons why he prefers shrub peonies to the rest. He points out the four defects of the *shao yao*: later flowering, stems that wither (after the flowering), flowers that are placed too low and so cannot be seen properly, and finally only a weak perfume. He appears to be particularly influenced by the *Xue pu za shu* 學圃雜疏 (Various Remarks on the Study of Gardening) by Wang Shimaō 王世懋, to whom he was close. In particular, he

⁶⁴⁹ See pp. 422–3 above.

⁶⁵⁰ *Belamcanda chinensis* DC.

followed him to Fujian and even wrote a preface for an essay by him on the plants of that province. He always cites him using his personal name, Wang Jingmei 王敬美. Nor is that the only person he refers to, for the text is studded with allusions to other works and also records remarks of friends and anecdotes. All these convey the aesthetic and emotional nature of Zhao Han's interest in plants. The location of his garden, in Shaanxi 陝西 (Shensi) province, where the climate is not particularly clement, renders him particularly aware of the problems of compatibility between plants and the environment; he frequently notes the geographical origin of his plants and whether or not they can adapt to his garden. On the subject of the narcissus, *shui xian*, he begins by pointing out that it is not native to his province and that the two kinds that he has were brought from the south. He records Wang Jingmei's comment that only the narcissus is an exception to the general taste for plants with double flowers, for in this case it is the single-flower types that are the most appreciated, which, as we have seen above, is also the opinion of Gao Lian. However, he does point out that, among all the varieties that he possesses, he has never come across any plants with double flowers that are perfumed, which suggests that generally it was only single flowers that were fragrant. He also notes that because the south is a region with a mild climate, the narcissi there flower in the twelfth month, whereas in his own garden blooming does not commence until the end of the following month and even then only if the plants are well manured. 'At the time of flowering', he writes, 'I place a flower in a vase of white porcelain set on a little lacquered table that is vermilion in colour, and it is as if I were facing an immortal from the Gushe Mountains' (Fig. 171). As an expert on plants in pots, he regrets that in the



Fig. 171. Detail from 'Narcissus', by Zhao Mengjian 趙孟堅 (1199–1267).

north gardeners are less skilful than those in the south at ‘twisting and producing an impression of great age’:

On the Hill of the Tiger, many monks pot such plants to sell to enthusiasts. I saw a villager bring a cypress that was no taller than one foot but with an ancient-looking trunk and well-spaced branches that gave an impression of natural creation; and also a Japanese apricot about one foot tall; from its dry old trunk no more than the size of a child’s arm came young leafy branches; it was so beautiful that it brought tears to the eyes: three or four flowers, all of them extraordinary! In the north such a thing is impossible to achieve.

On the subject of a plant of wintersweet (*la mei*) with an exceptional perfume that its owners wished to keep exclusively for themselves, he also writes,

I have heard it said that the Yi (伊) family took seeds from this tree and sowed them in their garden; but – why, I do not know – the flowers could not compare [with the flower of the initial tree]. In my garden, I have a tree slightly inferior to that one but better than all those in the neighbourhood. I must divide it up a lot so as to diffuse this variety.

He often tells of his efforts at acclimatisation. For example, he successfully plants a gardenia cutting with double flowers taken from a shrub in Sichuan, but he notices that the petals are a little smaller. Two or three *li* away – a hundred or so kilometres – to the south of his home, people of the south have transplanted some, ‘creating a whole forest of them’. He deplores the fact that the soil where he lives is not as good and describes an abortive attempt to grow a plant of an Arabian jasmine (*mo li*). His notes reveal his very sensitive sense of smell. He detests the tomato plant because its stem and leaves give off a smell that he finds unbearable. ‘The sweet-scented oleander (*jia zhu tao*), introduced in Shaanxi from the south at the beginning of the Wan Li period [1573], is now cultivated by the plant merchants of Changan; its blooms last for a long time, which is very agreeable, but’ – he adds – ‘it is such a shame that they no longer have any perfume!’ Other properties of various plants also attract his interest. He is intrigued that the gorgon plant or prickly water lily (*qian* 芡)⁶⁵¹ (Fig. 172; see also Fig. 220) and the water chestnut (*ling* 菱)⁶⁵² (Fig. 27; see also Fig. 220), both aquatic plants, have different pharmacological natures (*xing* 性), the former being warm, the latter cold, and he discovers the reason for this in the collection of notes made by Su Dongpo, *Qiu chi bi ji* 仇池筆記: it is because the flowers of the water chestnut turn their backs on the sun while those of the prickly water lily face it. He also tells us that kumquats are grafted on to *Poncirus* simply for the pleasure of the sight of them,⁶⁵³ for very few fruits are produced, unlike those in the south. He recalls that, after eating litchis in Chongqing, he kept the stones so as to plant them. He was astonished that, although they did produce shoots, his exercise was a failure, whereas it was well known that in Han Wu Di’s Shang Lin there were as many as a hundred trees that had been planted

⁶⁵¹ *Euryale ferox* Salisb. ⁶⁵² *Trapa bispinosa* Roxb.

⁶⁵³ See the interesting information in the chapter devoted to grafting, p. 500 below.

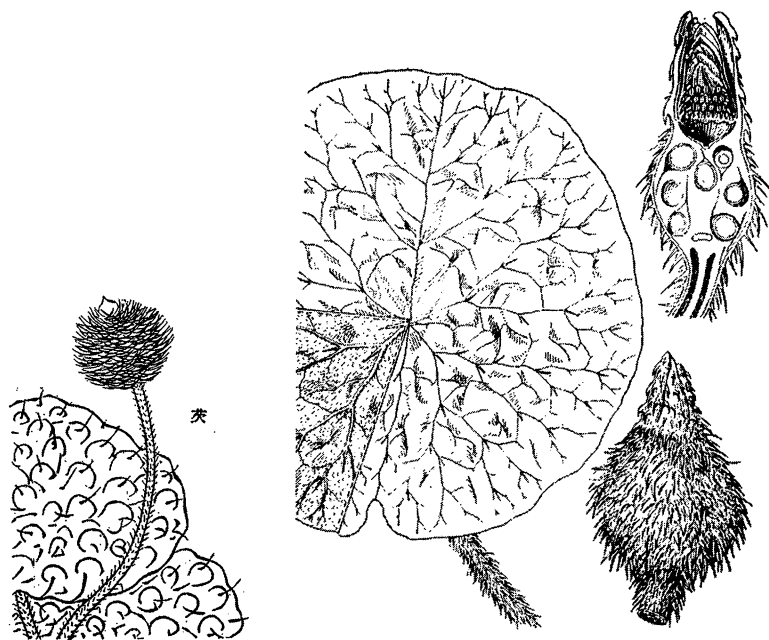


Fig. 172. Prickly water lily (*qian 茨*) (*Euryale ferox* Salisb.): (a) from *Zhi wu ming shi tu kao* (Wu Qijun, 1880, *juan* 32, p. 30a); (b) from anon. (1972–6, vol. 1, p. 167); see also Fig. 220.

there. He ends with a remark to the effect that nowadays you cannot find anything in this park that remains from the successes of the emperors of past generations. What he writes about the vine shows how careful his information is:

The two kinds of purple and white grape come from regions in the west. However, in those regions the white grape is excellent, nothing like the one in my garden, which has an acid taste. In my region there are also two varieties of grape. The better one is that which has widely spaced grapes, which become good and big. In the regions of the West there is also a green grape without pips [literally ‘without stones’, *wu he* 無核] and it is sweeter than the white one. It is very expensive and only the wealthy eat it. There is also a ‘little grape’ (*suo pu tao* 鎖葡萄) with grapes as big as peppercorns, which is less sweet than the purple one but sweeter than the white.

His accuracy is further attested by his honesty. When he does not know a plant, he simply says so. For instance, he says that he does not know what the *Zhuge cai* 諸葛菜, the ‘vegetable of Zhuge Liang’, is. This term has a double synonym, in the first place *man qing* 蔓菁, which designates the turnip, field mustard, and bird rape. Since he cites *man qing* just before this term and adds that it ‘was sown when the army of Zhuge Liang passed through’, he is no doubt referring to a wild plant of northern and central China, which is close to a turnip and the young shoots of which are

eaten as vegetables, the *xi cai* 蕙菜,⁶⁵⁴ also known as *Zhuge cai*. These few examples testify to Zhao Han's curiosity about plants. No aspect of them fails to interest him. He is at once a curious gardener who tries to introduce new plants that are found in southern regions; a gardener who notices small differences between an original plant and one that has been grown from its seeds, and which, no doubt for that reason, he propagates by division or grafting; a gardener who thinks about the effects of the soil and the climate on vegetation; a generous gardener who diffuses the rare varieties that he possesses; a scholar who is interested in the origin of names, in the history and in the medicinal properties of plants; and, to be sure, an aesthete who, like Gao Lian, talks to the most precious of his plant guests, which he installs in royal style in his study.

The next figure for us to meet is Ji Cheng 計成, who was born in 1582. He is known not as a connoisseur of plants but as the author of the *Yuan ye* 園冶 (The Figuration of Gardens),⁶⁵⁵ a unique treatise on the creation of gardens that was completed in 1631 and published three years later.⁶⁵⁶ Essentially, this work is concerned with the architecture of gardens, the constructions, buildings and stones. Plants do, however, make an appearance in a short text that serves as an introduction to the chapter entitled 'Yuan shuo' 園說 (A Discourse on Gardens). The passages that refer to plants are recorded here as a contrast to all the other texts that have been presented.⁶⁵⁷

Generally, when one sets up a villa garden, whether close to a town or in the country, it is best to choose a remote place; if a forest has to be thinned out, it must be cleared judiciously. Making the most of the opportunities offered by the landscape, alongside a stream one should cultivate *Cymbidiums* and angelica (*lan zhi* 蘭芷).⁶⁵⁸ The paths should be bordered by the 'three auspicious things' (*san yi* 三益),⁶⁵⁹ which symbolise eternity. Buried beneath the vegetation of usneas (*luo* 蘿), the walls will be invisible; roofs will emerge here and there between the treetops. When contemplating the distance from the top of a belvedere, one's gaze should meet with nothing but beauty; when one seeks solitude, a copse of deep-set bamboos will stir the heart. Tall and spacious galleries and unobstructed doors and windows will enable one to take in the light from the water and to seize upon the splendour of the four seasons. Firmianas (*wu*)⁶⁶⁰ always bring freshness and the shade of the *Sophoras* (*huai*) evokes spacious halls. Alongside riverbanks one should plant willows (*liu*),

⁶⁵⁴ *Orychophragmus violaceus* (L.) O. E. Schultz; cf Fèvre and Métaillé (2005, p. 480); anon. (1972–6, Volume 2, p. 35).

⁶⁵⁵ I have borrowed this translation from Stanislas Fung (1998, p. 212).

⁶⁵⁶ Chiu Che Bing (in Ji Cheng 1997, pp. 15–63) provides a detailed account of all that is known of his life and works.

⁶⁵⁷ English version of author's French translation. This text appears in Ji Cheng (1981, pp. 44–8) together with a translation into modern Chinese and notes. For the translation into English by Hardie Alison, see Ji Cheng (1988, pp. 43–4); for the French translation by Chiu Che Bing, see Ji Cheng (1997, pp. 90–4).

⁶⁵⁸ *Angelica* sp.

⁶⁵⁹ This expression designates the 'three friends of the cold in the course of the year', which may be the pine, the bamboo and the Japanese apricot tree, *song, zhu, mei* 松竹梅, or else the Japanese apricot tree, the bamboo and rocks. See Ji Cheng (1988, p. 46, n. 2).

⁶⁶⁰ *Wu* here stands for *wu tong* 梧桐, *Firmiana simplex* (L.) W. F. Wright (= *Sterculia platanifolia* L.; *Firmiana platanifolia* L.).

around the buildings one should cultivate Japanese apricot trees (*mei*). By mixing couch grasses (*mao* 茅)⁶⁶¹ in with bamboos, one creates what looks like great waterways ... The night rain on the banana trees is like the pearly tears of sirens; when agitated by a warm wind, the willows suggest the graceful swaying movements of Xiaoman.⁶⁶² Move a few bamboos to create a window, thin out a few pear trees to make a little courtyard ...

Those are the only remarks on the subject of plants. This relative poverty in my view confirms the fact that plants were the concern not of a 'stonemason' but of a garden's owner.

As we have already noted, Xu Guangqi 徐光啟 (1562–1633) owned two gardens – one in Tianjin, the other in Shanghai – and in them he undertook veritable experiments, in particular involving the introduction of plants from the north to the south and vice versa.⁶⁶³ We shall shortly be encountering him again, in connection with the cultivation of fruits, but first let us consider his activities relating to his garden, namely the use of the resources offered him by the plants that surround him. After reproducing the entire text of the *Qi min yao shu*, on the subject of how to create a hedge,⁶⁶⁴ he provides a list of thirty or so plant species suitable to include in it. The originality of this exercise lies in the fact that, for each cited plant, he notes in what respects it is interesting, doing so indeed on a number of levels: practical, technical, economic and also aesthetic. In an effort to render this account a little less tedious, I shall use abbreviated formulae to express two recurrent themes. Thus 'carpentry wood' will translate the term *gu* 骨, 'bone', which indicates the possible use of a trunk from which to fashion parts of the kind that are used in constructing tools, machines or vertical supports, or for carpentry and so on. Meanwhile, 'thorny' will translate 'thorns that can deter intruders'. Here, now, is the complete list of these plants.

Holly (*dong qing* 冬青):⁶⁶⁵ carpentry wood, medicinal fruits, evergreen leaves. Buckthorn (*jue mei* 爵梅):⁶⁶⁶ dye-producing leaves and twigs (green), carpentry wood, from very old trunks one can make stools and low tables. Acanthopanax (*wu jia pi* 五加皮):⁶⁶⁷ carpentry wood, thorny, edible buds, medicinal cortex of the root. Rose plant (*jin ying zi* 金櫻子):⁶⁶⁸ thorny, exquisitely fragrant flowers, medicinal fruits. Japanese apricot (*mei* 梅): exquisitely fragrant flowers, carpentry wood, thorny in the upper part of the trunk. Chinese boxtree (*gou qi* 枸杞): edible buds, medicinal fruits and roots, carpentry wood. Maple tree (*fei lai zi* 飛來子):⁶⁶⁹ edible flowers. The fagara (*jiao* 椒):⁶⁷⁰ thorny, carpentry wood, edible and medicinal fruits, leaves used for condiments, oil-producing kernel. The evodia (*zhu yu* 茱萸):⁶⁷¹

⁶⁶¹ *Imperata cylindrica* (L.) Beauv. var. *major* (Nees) C. E. Hubb.

⁶⁶² Concubine of the poet Bai Juyi (772–846), a famous dancer and singer, known in particular for her rendering of a piece entitled 'Willow Branch'.

⁶⁶³ On this aspect of the activities of Xu Guangqi, see Bray and Métaillé (2001, pp. 340 ff.).

⁶⁶⁴ See Mou Qiyu (1982, p. 178) for the original text, and Xu Guangqi and Shi Shenghan (1979, pp. 1021–2) for its reproduction in the *Nong zheng quan shu*.

⁶⁶⁵ *Ilex* sp. Unless indicated otherwise, the identifications that follow are those of Shi Shenghan, completed by the authors' names, in Xu Guangqi and Shi (1979, pp. 1036–8).

⁶⁶⁶ *Rhamnus utilis* Decne.

⁶⁶⁸ *Rosa laevigata* Michx.

⁶⁶⁹ *Acer oblongum* Wall. ex DC.

⁶⁷⁰ *Zanthoxylum simulans* Hance.

⁶⁷¹ *Evodia officinalis* Dode, or even *Evodia rutaecarpa* (Juss.) Benth.

carpentry wood, edible and medicinal fruits. The gardenia (*zhi zi* 梔子): carpentry wood, fragrant flowers, medicinal and dye-producing fruits, evergreen leaves. Spiney holly (*mao nai zi* 貓奶子):⁶⁷² carpentry wood, thorny, evergreen foliage, fragrant flowers, edible young leaves; this is 'the tea of the immortals' (*shen xian cha* 神仙茶). Winter jasmine (*ying chun hua* 迎春花):⁶⁷³ short-lived flowers. The jujube tree [Chinese date] (*suan zao* 酸棗):⁶⁷⁴ carpentry wood, thorny, edible fruit, medicinal kernels. Magnolia (*mu bi* 木筆):⁶⁷⁵ carpentry wood, beautiful flowers. The mulberry tree (*sang* 桑): carpentry wood, leaves to feed silkworms, edible and medicinal fruits. The *Poncirus*/hardy orange (*zhi* 枳): carpentry wood, thorny. The rose of Sharon (*jin* 槿): carpentry wood, flowers for picking. Japanese rose (*ye qiang wei* 野薔薇): thorny, flowers for distillation. The paper mulberry tree (*gu* 穀): carpentry wood, sap for making glue for the gilded characters of books, medicinal fruits, bark for making paper, wood for the cultivation of mushrooms. China-berry tree (*lian* 楝):⁶⁷⁶ carpentry wood, rapid growth. The elm (*yu* 榆): carpentry wood, rapid growth, edible fruits. The poplar (*bai yang* 白楊):⁶⁷⁷ carpentry wood, rapid growth, when cut provides firewood. The *Cunninghamia*/Chinese fir (*ci shan* 刺杉):⁶⁷⁸ carpentry wood, thorny. The Chinese locust tree (*zao jia* 皂莢):⁶⁷⁹ carpentry wood, rapid growth, edible buds, thorny. The Asiatic sweetleaf (*shan fan* 山礬):⁶⁸⁰ evergreen, fragrant flowers, easy to grow. The Japanese honeysuckle (*jin yin hua* 金銀花):⁶⁸¹ fragrant and medicinal flowers. The cedrella (*chun shu* 椿樹):⁶⁸² easy to grow, edible buds. The loquat (*pi pa* 枇杷), rapid growth, winter flowering, medicinal flowers, dark green leaves and trunk. The Chinese poplar (*xiao ye shu* 小葉樹):⁶⁸³ rapid growth, edible buds. The Thunberg vine (*mu long* 木龍):⁶⁸⁴ rapid growth, evergreen foliage, but stinging.

As we can see, out of the thirty-one species cited, in twenty cases the trunk provides a useful material; the presence of thorns is a feature of nine plants; eight provide fruits and two provide roots that are of use for medicinal purposes; from an aesthetic point of view, the perfume of the flowers is noted in six cases, their beauty in two cases, and the fact that they bloom in the winter in one case. The evergreen quality of the leaves is always noted (five cases); easy and rapid growth is noted in nine cases; as for edibility, both fruits and buds are mentioned in six cases, the flowers in two cases, and leaves that are the sources of beverages are noted in two cases, while those that are sources of condiments are noted in one case. This list might seem to be purely rhetorical were it not for the fact that we are aware of the author's taste for experimentation and his interest in finding foodstuffs that can be used as substitutes in times of famine. In the *Nong zheng quan shu*, he himself refers to his appreciation of the edibility of the various parts of wild plants (bark, roots, fruits) that he has already tested.⁶⁸⁴ According to his brush notes, the edges of a garden could become a source of extra income in normal times and a vital resource in periods of hardship.⁶⁸⁵

⁶⁷² ? *Ilex cornuta* Lindl. ⁶⁷³ *Jasminum nudiflorum* Lindl.

⁶⁷⁴ *Zizypus jujuba* Mill. var. *spinosa* (Bunge) Hu (= *Zizypus spinosa* Hu), in Fèvre and Métaillé (2005, p. 437).

⁶⁷⁵ *Magnolia liliflora* Desf. ⁶⁷⁶ *Melia azedarach* L. ⁶⁷⁷ *Populus tomentosa* Carr.

⁶⁷⁸ *Cunninghamia lanceolata* (Lamb.) Hook. In Fèvre and Métaillé (2005, p. 402). ⁶⁷⁹ *Gleditschia sinensis* Lam.

⁶⁸⁰ *Lonicera japonica* Thunb. ⁶⁸¹ *Toona sinensis* (A. Juss.) Roem. = (*Cedrela sinensis* Juss.).

⁶⁸² *Populus cathayana* Rehd. ⁶⁸³ *Vitis thunbergii* Sieb. et Zucc. in anon. (1977, p. 2539).

⁶⁸⁴ See Xu Guangqi, Shi (1979, p. 632). See also Bray and Métaillé (2001, p. 344).

⁶⁸⁵ But it should be noted that in his list no plant is assumed to possess an intrinsic power of protection. See a *contrario* Portères (1965).

Li Yu 李漁, personal name Li Weng 笠翁, surname Hu Shang Li Weng 湖上笠翁, was a native of Lanqi 蘭溪 to the south of Hangzhou, where he was born in 1611. He graduated as *xiu cai* 秀才, bachelor, in 1635, but never proceeded beyond this first level. After the collapse of the Ming dynasty in 1644, he gave up all ambitions to an administrative career, choosing instead a life that was precarious from a financial point of view but rich in intellectual, social and certainly emotional satisfaction. He composed songs, operas and novels and organised theatrical performances, travelling throughout China with a troupe composed entirely of forty or so female singers and actresses. In around 1657 he settled in Nanking where, on a hillside, he set up a villa garden, which he called Jie zi Yuan 芥子園, the 'Mustard Seed Garden', a reference to its diminutive size. He also founded a publishing house, which he was obliged to sell twenty years later in order to pay his debts. It was thanks to friends that he was then able to acquire in Hangzhou a small property with an old garden, which he set about reorganising, the Ceng Yuan 層園, the 'Terraced Garden', where he died in around 1680.⁶⁸⁶ Unsurprisingly, he was interested in plants. He is remembered for the classification in three categories that he established, founding the categories on the nature of the plants' roots, and also for his views on the nature of plants, which he believed to be endowed with sensitivity, justifying this by the case of the crape myrtle.⁶⁸⁷ The following passage relates to the three categories of plant with which he introduces the chapter that he devotes to plants in his collection of notes *Xian qing ou ji*, 閒情偶寄 (Scattered Notes Made at Leisure) (preface dated 1671):

The categories of plant are extremely complex but it is possible to distinguish three main ones: [with] ligneous stock (*mu ben* 木本), with vine-like stock (*teng ben* 藤本) and with herbaceous stock (*cao ben* 草本).⁶⁸⁸ The ones with ligneous stock are solid, seldom change and are long-lasting, for they have deep roots. The ones with vine-like stock have less-developed roots, which accounts for their weakness, their need for supports and the fact that they seldom live for more than a few decades. The herbaceous ones have even more superficial roots, which is why the white frost harms them and they live no longer than one year.⁶⁸⁹

Moving on from that observation, he passes, by way of a metaphor, to the case of human beings who need to try morally to develop a root as solid as that of a tree. In this way, he places the investigation of things (*ge wu* 格物) at the heart of the garden, where the plants provide an object of reflection and meditation. Each one of his rubrics sets an example. On the subject of the peach tree, he deplores the fact that his contemporaries seek only to satisfy their greed, for in order to have fine fruit it is necessary to graft. But grafting kills that which is naturally beautiful and to be found only in wild trees. He points out that when one speaks of the beauty of cheeks 'like

⁶⁸⁶ For a more complete account of his biography, see Dars (2003, pp. 6–15), from whom I have borrowed the information provided here.

⁶⁸⁷ See the chapter entitled 'Knowledge of plant life', *SCC*, Volume 5. ⁶⁸⁸ Li Yu (1991, p. 279).

⁶⁸⁹ Li Yu (1991, p. 238).

peaches' or 'peach dimples' the comparison only applies to natural trees that are not grafted and, in order to contemplate such trees, the places to go are certainly not famous gardens. On the subject of the fragrant laurel, *jia zhu tao* 夾竹桃, 'peach tree narrow bamboo', whose absence of any perfume, in his own province, Zhao Han deplored, he makes a different point. While he appreciates the flower, he is bothered by the name, for how can one put together a bamboo, which he assimilates to a virtuous scholar, and a peach tree, which resembles a beautiful, elegant woman! Faced with such a contradiction, he suggests renaming this laurel *sheng hua zhu* 生花竹, 'bamboo with flowers'. By doing so one will give the bamboo its due, for it is one of 'the three friends [of winter], along with the pine and the Japanese apricot, but is the only one that does not flower. Is this not a way of becoming in harmony with nature?' he thinks. With his pomegranate trees, he introduces us into his garden:

The Mustard Seed Garden takes up no more than three⁶⁹⁰ *mu*, one of which is for buildings and one for rocks; there are also four or five pomegranate trees that are not dispersed but all adorn my dwelling. It is also pomegranate trees that have taken possession of my plot of land, preventing anything else from growing. But do not the advantages and the disadvantages of pomegranate trees balance out? Judiciously used by their proprietor, even if they are numerous, there are never too many of them. By nature, a pomegranate tree likes to be compressed, and its roots bear stones on top of them so as to make a mountain of which they form the foot. By nature, pomegranate trees love the sun, so their shade can protect dwelling places, and where they grow they form as it were a roof for the houses. Again by nature, pomegranate trees like to grow up straight; so their welcoming branches can become a pavilion in which to welcome the immortals, guests from Heaven, and for me, leaning against a balustrade, their flowers are protective guardians. That is the way that the master of the Mustard Seed Garden distributes his pomegranate trees, and I beg you to tell all those who look after trees about this.

This collection of notes, initially entitled *Li weng mi shu di yi zhong* 笠翁秘書第一種 (The First Secret Notebook of the Old Man with a Rain Hat)⁶⁹¹ is famous for, among other things, its description of practical inventions to improve one's comfort, such as heated chairs and refreshing stools, but he also describes ingenious inventions with aesthetic purposes. For example, in order to transform the contemplation of a landscape into a whole series of pictures, he had the idea of cutting into the sides of a boat openings of various shapes – fan-shaped, round, rectangular – the better 'to borrow the view' (*qu jing zai jie* 取景在借), which, as the craft moved over the water, would appear within these frames.⁶⁹² It thus comes as no surprise to read what he proposes in order to improve a contemplation of the winter-flowering Japanese apricot trees in a natural or garden setting.⁶⁹³ In order to avoid the disadvantages of the cold weather, one has to equip oneself in a suitable manner, for the trees bloom in the middle of winter:

⁶⁹⁰ One *mu* = 1/15 hectare. ⁶⁹¹ Cf Dan Jinheng in Li Yu (1985, p. 2).

⁶⁹² See the whole paragraph devoted to this appropriation of landscapes, Li Yu (1985, pp. 157–67).

⁶⁹³ Li Yu (1985, p. 240).

There are two ways to contemplate the apricot trees (*mei*). Whoever goes into the mountains should take a tent, three sides of which are closed while one is left open, made of coarse muslin; in the tent, install a stove with a supply of coal so as to keep warm and heat up drinks.⁶⁹⁴ That is the first method. Whoever lives in a garden should install several paper screens, to form a horizontal protective roof and four sides into which windows will be inserted so that they can be open or shut depending on whether there are flowers to view or not. Such screens are not limited to the viewing of Japanese apricot trees. They are suitable for all flowers and can be installed in a dwelling throughout the year. One could fix up a little horizontal notice saying, 'Here one can approach the flowers'. Whatever the flowers may be, a flag can be set up among them, bearing the inscription, 'Flowers magically brought closer'. That is the second method.

As can be seen, the inventiveness of Li Yu is not limited to furnishings. Flowers appear throughout his notes as an inexhaustible object of admiration, contemplation and study.

A reading of the *Hua jing* 花鏡 (Mirror of Flowers) (1688) by Chen Haozi presents us with an approach that seems on the one hand less intellectual and more playful yet on the other concerned practically with appreciating a landscape. The chapter entitled 'Natural Objects' shows us how, by playing on the literal meaning of the names of plants, one can intermingle real objects and a simple play on words:⁶⁹⁵

One cuts down a cypress, makes doors out of it; one weaves usneas together, to make curtains; one interweaves bamboos to make a palisade; lean against a pine tree and you have a seat; the forest is spontaneous and generous . . .

A little nick in a peach stone; a walking-stick from an old liana (*gu teng zhang* 古藤杖); a brush of wood;⁶⁹⁶ a sabre of bulrushes;⁶⁹⁷ an azure brush-holder (*bi tong* 碧筒);⁶⁹⁸ a grass book-strap (*shu dai cao* 書帶草);⁶⁹⁹ a banana-leaf fan (*jiao shan* 蕉扇); a hemp-palm rope (*zong suo* 棕索);⁷⁰⁰ a golden lantern (*jin deng* 金燈);⁷⁰¹ a lotus pearl (*he zhu* 荷珠);⁷⁰² a brocade belt (*jin dai* 錦帶);⁷⁰³ a jade hairpin (*yu zan* 玉簪);⁷⁰⁴ silver winged elm seeds (*yu jia qian* 榆莢錢);⁷⁰⁵

⁶⁹⁴ Not tea, which, of course, would not be reheated, but *jiu* 酒, a generic term designating all alcoholic beverages.

⁶⁹⁵ Chen Haozi (1964, p. 85).

⁶⁹⁶ The Chinese text juxtaposes *mu*, 'tree', 'wood', and *bi*, 'paintbrush', an allusion to the magnolia, *mu bi* 木筆 (*Magnolia liliiflora* Desf.).

⁶⁹⁷ Here too the author plays on words; *pu* 蒲, reedmaces, and *jian* 劍, sword: *pu-jian* is the name given to the bulrushes that were hung at the doors of houses on the fifth day of the fifth month; they were believed to ward off evil influences.

⁶⁹⁸ Here, the wordplay uses *tong* 筒, a bamboo paintbrush holder, which refers to 'bamboo', *zhu zi* 竹子; and *bi* 碧, 'azure', associated with *zhu zi*, gives *bi zhu zi* 碧竹子, one of the names given to the dayflower, *Commelina communis* L.

⁶⁹⁹ *Ophiopogon japonicus* Ker-Gawl.

⁷⁰⁰ *Trachycarpus fortunei* (Hook. f.) H. Wendl. (= *T. excelsus* H. Wendl.). The fibres are used to plait ropes that are mostly employed in southern China, stretched across a wooden frame, to make a bed-base.

⁷⁰¹ *Lycoris aurea* Herb. ⁷⁰² Pearls of water in the hollows of lotus leaves.

⁷⁰³ *Jin dai hua*: *Weigelia florida* (Bunge) A. DC.

⁷⁰⁴ *Hosta plantaginea* (Lam.) Aschers. The Chinese name recalls the myth of the origin of these plants: during a heavenly banquet hosted by the Queen Mother of the West, Xi Wang Mu, slightly tipsy female immortals, shaking their heads, dislodged the jade pins that secured their chignons. When they fell to earth, these pins engendered plantain lilies (*Hosta* sp.), the flower buds of which were shaped like the jewels that had produced them.

⁷⁰⁵ The winged seeds of elms, *yu jia*, were also called *yu qian* 榆錢, 'elm sapekes'.

coconut ladles; bamboo walking sticks; wood [sculpted into] basins (*yíng yu* 癭盂); coral pearls (*shan hu zhu* 珊瑚珠)⁷⁰⁶...

But the author does not only indulge in word-play, and in another chapter, this time of a technical nature, he sets out his principles for organising a garden. Here is a translation of the gist of a passage which will serve to complement the texts cited above:

Method for planting in the right places:

A famous garden with no exceptional plants is like a sumptuous boudoir for too young a beauty; if there are plants but they are not positioned well, it is like an imperial treasury organised by a young cowherd. Some plants like the cold, others like the heat, some flourish high up, others lower down; even if nature causes them to grow, it cannot arrange to do this so that each is in the right place. There are methods of knowing where and when to plant and sow. If a garden is of a huge area, it makes sense to plant a good number of fruit trees, large trees and bamboos there. In the opposite case, only herbaceous flowers and medicinal herbs are suitable. When positioning the plants, if there is a luxuriant forest to the left, to the right one must leave empty spaces to let the air in; if in front there is a pool full of vegetation, behind it one should construct a terrace with a pavilion on it to fill the space. If outside there is a winding path, one must place piles of interesting stones to complement it. One must put sun-loving plants on an east-west axis and shade-loving ones in a garden to the north but where they receive the beneficent impact of the south. Of course one must harmonise the colours of the plants. What suits the beauty of peonies are sculpted or jade supports with here and there bizarre stones with twisted shapes, to set off the distant reflection of bamboos. The flowers of the Japanese apricot trees and wintersweet are suitable for loose hedges and clumps of bamboo; the twisted old trunks of the former planted with a mixture of white and red blossom do very well along curving balustrades. The elegant space reserved for the narcissus and the *Cymbidium* is suitable for fine magnetite stones; by placing them close to a window at the edge of a room, one can enjoy their fragrance in the mornings and the evenings. The graceful flower of the peach tree suits dipping terrains, with the little bridges and streams of country houses; place along their banks leaning blue-green willows which will reflect the red mists when the sun rises and sets. The crimson flower of the apricot tree suits the corners of roofs and high walls, thin woods and vast belvederes. The elegance of the pear tree (*li* 梨) and the purity of the plum tree (*li* 李) suit quiet courtyards and orchards that are left to themselves; on bright mornings and misty evenings one can invite a distinguished guest there to share various kinds of alcoholic drinks or even just tea. The red of the pomegranate tree, the brilliance of the mallow (*kui* 葵), suit walls that are as white as if powdered and green windows. At night the moon shines, the wind sometimes carries strange fragrances, and with a wave of the fly-whisk one sweeps away the long summer. The proximity of lotuses enhances pavilions built on the water; they load the warm breeze with the perfume of amber and turn the dew into pearls. The high moral stance of the chrysanthemums suits pavilions with thatched roofs and other places of meditation. They are symbols of purity. The elegance and beauty of the Chinese flowering apple tree (*hai tang*) suits sculpted walls and mountain shelters; one can create separating walls with sky-blue swathes of gauze, light a silvery candle, lean on the balustrade

⁷⁰⁶ These pearls are the fruits of the Chinese aucuba, *Aucuba chinensis* Benth. (*tao ye shan hu* 桃葉珊瑚, literally 'peach-leaves coral').

or stretch out indoors. The sublime perfume of the sweet olive (*mu xi* 木樨) suits high terraces and spacious dwellings; making the most of a fresh breeze, one sits in the moonlight . . . The abundant blooms of the Chinese redbud (*zi jing* 紫荊) last a long time; it suits bamboo hedges and beds of flowers. The beauty and serenity of the hibiscus (*fu rong* 芙蓉)⁷⁰⁷ enhance the streams of water in cold weather and the ponds in autumn. The shapes and colours of the pines and cypresses go well with curving walls and extraordinary mountaintops; lianas and usneas create a sense of movement. The coolness provided by the bamboos and the Chinese parasol trees makes them suitable for deep courtyards and lonely huts. Seen from afar, the snowy buds of the reeds and the vermilion red of the liquidambars swaying in the wind enhance pavilions several storeys high. The golden masses of Japanese globeflowers (*di tang* 棣棠) and the brocade screens of Japanese roses (*qiang wei*) beautifully complement dividing doors and pergolas. It is not possible to cite all the other remarkable plants but one can extrapolate from all these examples. By taking into account dimensions, the dates of flowering and the density of colours, one should go ahead and combine plants without any reservations. Although medicinal and other wild herbs may enhance the general scene, they will not suffice to make a villa garden superb. If, throughout the four seasons, there are always plants in bloom, then those two words ‘famous garden’ really mean something and the fame of the owner will be great.

This text ends by making one of the main points about having a garden, namely the desire to see flowers appear there throughout the entire year. In this way a garden marks out the seasons, for each has its own flowers, but at the same time the continuous presence of blooms in a sense transcends them. Apart from setting out the major principles that should prevail in the organisation of a villa garden, Chen Haozi also mentions the introduction of certain plants into the living rooms and workrooms of the dwelling. This seems an important point for, whether it be in the form of a potted plant or that of a bouquet, most of the other authors cited have also mentioned the pleasure afforded by the sight of such elegant beauty that may, furthermore, be emitting a delicious perfume. So, to round off this section, let us now consider two important aspects of people’s attitudes to ornamental plants in both China and Japan, namely the art of composing bouquets and cultivating plants in pots. As we have seen, both are often mentioned when literati describe or refer to their gardens. Chen Haozi justifies pot plants by pointing out that, while anyone can dream of a country residence, few, apart from the wealthy, can afford the luxury of a place in town where a garden can be created.⁷⁰⁸ For this reason he devotes the seventeenth of his eighteen methods of treating plants to ‘cultivating plants in pots in order to borrow landscapes’ (*zhong pen qu jing* 種盆取景),⁷⁰⁹ although he does not use the term *pen jing* 盆景 (*bonkei* in Japanese), ‘potted landscaping’, that is already to be found in Sun Zhibo, who describes it as ‘flowers

⁷⁰⁷ *Hibiscus mutabilis* L.

⁷⁰⁸ Without excluding the mystical approach developed by Rolf Stein (1987) to explain the function of these plants cultivated in pots, I have suggested (Métailié 1998c) that such a way of growing plants, which made them transportable, made it possible for scholar-officials to take their gardens with them when, as so often happened, they were transferred to new posts, and even to enrich it with plants from other regions of China.

⁷⁰⁹ Chen Haozi (1964, pp. 68–9). This may have been the original expression from which the term *pen jing*, cultivation in pots, was derived from the wider sense of *pen zai* 盆栽 (*bonsai* in Japanese).

in pots that can be placed on pedestals and ordinary tables'.⁷¹⁰ Chen Haozi immediately points out that it is much more difficult to tend and water than a real garden, for such trees are far more sensitive to dryness, to humidity, to cold and to heat than fully grown trees are. The soil that is used is of crucial importance since, because only a thin layer is used, it is not very nutritive. His advice is to prepare the soil very carefully before attempting to grow a plant. In order to do so, during the winter one must take mud from a ditch exposed to the south, dry it and sift it to eliminate gravel and brick fragments. Then moisten it with manure and dry it again; do this several times. Put together a layer of dry grasses and wood shavings and add a layer of the prepared soil, burn it and preserve it until the spring. This will then be suitable for all plants, whether they be grasses or trees. After planting, he advises regular manuring with a mixture of liquid manure and water in which hen and goose feathers have been soaked. When flower buds appear, stop the liquid manuring, and when the flowers appear, cease watering. From then on give it pure water each morning and evening but cease all watering when the fruits form; otherwise the fruits will fall off. The plants can be set in place between the third and the fourth months, which will deter the formation of roots and favour abundant blooming; he adds that if there are too many roots, there will be few flowers. The plants should be irrigated using water in which the droppings of silkworms have been dissolved. All the above advice, he says, applies to trees, for all herbaceous plants adapt well to potting and, for them, no more advice is needed. Chen Haozi then provides a list of the trees and shrubs that adapt well to this kind of cultivation: pines, cypresses, elms, liquidambars, tangerine trees, peach trees, Japanese apricot trees, tea plants, osmanthus, pomegranates, roses of Sharon (*jīn 檣*),⁷¹¹ phoenix-bamboos (*fēng zhū 鳳竹*),⁷¹² tiger-thorns (*hú cǐ 虎刺*),⁷¹³ fragrant daphnes, Chinese peashrubs (*jīn què 金雀*),⁷¹⁴ Chinese flowering apple trees (*hǎi táng*),⁷¹⁵ Chinese box (*huáng yáng 黃楊*), rhododendrons, China roses, Arabian jasmines, 'fire banana trees' (*huǒ jiāo 火蕉*),⁷¹⁶ Spanish jasmines (*sù xīn 素馨*),⁷¹⁷ Chinese boxtrees, Chinese wolfberries (*gōu qǐ 枸杞*), syringas/lilacs (*dīng xiāng*), peony shrubs, ardisias (*píng dì mù 平地木*)⁷¹⁸ and serissas (*liù yuè xuě 六月雪*).⁷¹⁹ He goes on to say that although all these trees can be cultivated in this way, it is nevertheless necessary to prune them properly. He ends by proffering advice about the receptacles to be used for the plants. It is worth noting that he suggests no hierarchy between the plants, but just dispenses valuable advice regarding their cultivation. In this respect he is quite different to one of his contemporaries, Wen Zhenting 文震亨 (1585–1645), personal name Qimei 啟美, a native of Changzhou 長洲, now Suzhou, who proposes an essentially aesthetic approach in his *Chang wu zhi*

⁷¹⁰ *Pei hua ao jue lu*, 52b. ⁷¹¹ For *mu jīn* 木槿, *Hibiscus syriacus* L.

⁷¹² For *fēng wěi zhū* 鳳尾竹, *Bambusa multiplex* var. *nana* (Roxb.) Keng f. See Geng Yili (1965, p. 57).

⁷¹³ *Dammacanthus indicus* Gaertn. ⁷¹⁴ *Caragana sinica* (Buc'hoz) Rehd.

⁷¹⁵ *Buxus microphylla* Sieb. et Zucc. var. *sinica* Rehd. and Wils. (= *Buxus sinica* (Rehd. and Wils.) Cheng.

⁷¹⁶ Not identified. ⁷¹⁷ *Jasminum officinale* L. var. *grandiflorum* (L.) Kobuski.

⁷¹⁸ Synonym of *zi jīn niú* 鳳尾竹 (see Luo Zhufeng, 1986–94, Volume 2, p. 925); *Ardisia japonica* (Horns.) Bl.

⁷¹⁹ *Serissa foetida* Comm.

長物志 (Records on Superfluous Things).⁷²⁰ In first place he sets the *tian mu song* 天目松⁷²¹ ('pine of the Tianmu mountains') 'the size of which must not exceed two feet or be less than one, with a trunk like a forearm and bunches of needles', perfectly twisted in the manner of the paintings of Ma Yuan 馬遠, Guo Xi 郭熙 and Liu Songnian 劉松年.⁷²² Next, an old Japanese apricot tree with a wrinkled trunk, all covered in drooping 'mossy beards'. The list continues with the Chinese wolfberry (*shui dong qing* 水冬青),⁷²³ a purpus privet (*ye yu* 野榆), the wild elm and the Chinese juniper (*gui bai* 檜柏).⁷²⁴ In second place come the *shui zhu* 水竹,⁷²⁵ 'the aquatic bamboo' from Fujian; *hu ci* 虎刺, the tigerthorn from Hangzhou; *chang pu jiu jie* 菖蒲九節,⁷²⁶ the sweet rush 'with nine nodes' which is much sought-after but very difficult to maintain; *pan tao shuang guo* 蟠桃雙果,⁷²⁷ the flat peach tree, a saucer peach with double flowers. In the spring the most highly esteemed are the *Cymbidiums* (*lan hui* 蘭蕙); in the summer, the easter lily (*ye he* 夜合),⁷²⁸ the white trumpet lily (*huang xiang xuan* 黃香萱), the fragrant yellow *Hemerocallis* and the sweet-scented oleander (*jia zhu tao* 夾竹桃); in autumn, the small honey-yellow chrysanthemum (*huang mi ai ju* 黃蜜矮菊); in winter, the small narcissus with short leaves (*duan ye shui xian* 短葉水仙),⁷²⁹ and the Indian shot (*mei ren jiao* 美人蕉).⁷³⁰ To end, Wen Zhenting offers more advice concerning the receptacles in which to place the plants. The best are ancient bronze vessels of a dark green colour; next-best are white porcelain pots from Dingzhou 定州 or porcelain ones from the capital. If absolutely necessary one can use vases of recent fabrication provided they are of five colours and are made by Gong Chun 供春.⁷³¹ All the rest, he declares, are not worthy to receive exceptional plants. He recommends circular vases, dislikes square ones and bans rectangular ones.

The fact that such cultivated plants can play a role as substitutes for gardens does not, of course, exclude their also being placed in a garden or in rooms in the buildings to be found in gardens. As Gao Lian and Chen Haozi show, the fact of

⁷²⁰ On the importance of this text, see Clunas (1996).

⁷²¹ *Pinus taiwanensis* Hayata; see Wen Zhenting (1984, p. 65, n. 2). This pine is also the species that, according to Gao Lian, had to be placed in one of the most precious containers. Cited by Kathleen Ryor (2002, p. 69). It was also the first of all the trees suited to cultivation in a pot (*Pei hua ao jue lu*, 52a) that is cited by Song Zhibo.

⁷²² Three painters of the Song period. Ma Yuan was one of the 'four famous painters of the Southern Song'.

⁷²³ *Ligustrum quihoui* Carr. (= *Ligustrum brachystachyum* Dcne). Cf Wen Zhenting (1984, p. 99, n. 13).

⁷²⁴ *Sabina chinensis* (L.) Antoine (= *Juniperus chinensis* L.).

⁷²⁵ Wen Zhenting (1984, p. 99, n. 16) cites texts that suggest that this was a very small plant. The details provided by Sun Zhibo – 'five or six inches high, delicate leaves ... but when the (bamboo) shoot (*sun* 笋) reaches four or five inches, cut off the tip, so that it stops growing ...' – show clearly that this is a bamboo plant. So the identification of *Phyllostachys nigra* (Lodd.) Munro var. *henonis* (Mitf.) Stapf ex Rendle (see Geng Yili (1965, p. 106)) which, a priori, seemed hard to accept (given that Wen Zhenting advised planting several in the same pot and bamboos of this species grow to between seven and eighteen metres) is perhaps possible after all.

⁷²⁶ A much-appreciated kind of Japanese sweet flag, *Acorus gramineus* Soland. See Wen Zhenting (1984, p. 100, n. 18).

⁷²⁷ These peach trees (*pan tao*) are a variety that produces flat fruits: *Prunus persica* (L.) Batsch var. *compressa* (Loud.) Bean. The form recommended by Wen Zhenting furthermore bears double fruits.

⁷²⁸ *Lilium longiflorum* Thunb.

⁷²⁹ This is the fragrant kind with single flowers, which is smaller than the kind with double flowers.

⁷³⁰ *Canna indica* L.

⁷³¹ A famous potter from Yixing in the Ming period; see Wen Zhenting (1984, p. 83, n. 8).

living in the middle of a garden does not stop the proprietor from gathering specially chosen flowers and putting them in a suitable vase for the pleasure of having them there to look at. Chen Haozi mentions another possible role for a bouquet, as in the case of *pen jing*, namely that of compensating for the absence of a garden,⁷³² as we are reminded by Yuan Hongdao 袁宏道, personal name Zhonglang 中郎 (1568–1610):⁷³³

My lodging house is sad and cramped, and I move my residence at irregular intervals, so I have no other alternative than to arrange flowers in a vase, changing the arrangement in all seasons ... I took my passion for flower-arranging as normal and forgot the great pleasure of landscape!

I would suggest that anyone interested in knowing more should consult the important book by Li Hui Lin (1959) and also the works of Léon Vandermeersch (1965) and Cao Wenxin (1991), all of whom provide valuable information on the various aspects of the history of flower arrangement in China. I will now call upon Bai Juyi to bring this section to a close, for in a poem of his entitled ‘Two pines’ he declares

that he was often tired on returning to his lonely house with nothing to comfort him. So he planted two pine trees in his courtyard, treating them as his guests. After this he never felt lonely again, as he imagined they were three people in his home. When the emperor called him for duty elsewhere he felt sorry because he knew that during leisure hours he would be separated from his bosom friends.⁷³⁴

(4) FRUIT PRODUCTION

(i) *A glimpse of origins*

Nikolai Ivanovitch Vavilov considered that China was ‘the earliest and largest independent center of the world’s agriculture and of the origin of cultivated plants’.⁷³⁵ He named thirty-nine species of cultivated fruit tree, fifteen of which represented the Rosaceae family (apple trees, pear trees, plum trees, apricot trees, quince trees, loquat trees and so on). In the history that he devotes to cultivated plants in China, Li Fan 李璠 lists twenty-six species and botanical genera,⁷³⁶ which in fact cover a greater number of species that were cultivated in ancient times but also include plants introduced more recently such as pineapple trees. Harlan, for his part, cites fourteen species of fruit tree domesticated in

⁷³² See Chen Haozi (1964, p. 70). ⁷³³ Cited and translated by Kathleen Ryor (2002, p. 71).

⁷³⁴ Cited in Koehn (1942, p. 3). ⁷³⁵ Vavilov (1951, pp. 24–5).

⁷³⁶ Li Fan (1984, pp. 165–228). The author cites the following species: *Prunus persica*, *P. salicina* Lindl., plum; *P. armeniaca* L., apricot; *P. mume* Sieb. et Zucc., Japanese apricot; *P. pseudocerasus* Lindl., cherry; *Malus pumila* Mill., apple; *Pyrus bretschneideri* Rehd., Chinese pear; *Eriobotrya japonica* Lindl., loquat; *Myrica rubra* Sieb. et Zucc., Chinese arbutus; *Vitis vinifera* L., grape; *Zizyphus jujuba* Mill. and *Zizyphus spinosus* Hu, Chinese jujube; *Castanea mollissima* Bl., Chinese chestnut; *Corylus heterophylla* Fisch., Chinese hazelnut; *Diospyros kaki* L., Chinese persimmon; *Juglans regia* L., walnut; *Torreya grandis* For., *Citrus* spp.; *Fortunella* spp.; *Litchi chinensis* Sonner.; *Euphoria longana* Lam., longan; *Ficus carica* L., fig; *Punica granatum* L., pomegranate; *Cocos nucifera* L., coconut; *Ananas comosus* (L.) Merr., pineapple; *Musa acuminata* Colla, banana; *Canarium album* Blanco, Chinese olive; *Mangifera indica* L., mango.

China.⁷³⁷ Three studies relating to plants in the poems of the *Shi jing* mention estimates that vary from seven to fifteen kinds of fruit tree for northern China; Geng Xuan mentions seven while the identifications suggested by Lu Wenyu and Wu Houyan bring that figure up to around fifteen in all.⁷³⁸ Xin Shuzhi and Yi Qingheng⁷³⁹ list twenty fruits cited in the poems of the *Shi jing* and thirty-one fruit-producing plants that are named in the *Er ya*, but that does not represent all the fruit-producing plants cultivated in ancient China, as those in southern regions are, of course, not mentioned.

The importance of fruits produced in gardens is recognised already by Shi You 史游, who was active in the reign of Yuan Di of the Western Han (between -48 and -33), in his *Ji jiu pian* 急就篇 (Handy Primer):⁷⁴⁰ (1) 'vegetables, fruits and fruit-vegetables (*luo*) in gardens help the grain to grow', and popular sayings, such as (2) 'With a thousand serf-trees, no bad years'.⁷⁴¹ This importance is also attested by other remarks that appear in the texts. For example, in the case of a dioecious plant such as the *Ginkgo biloba*, we have seen that Duan Chengshi mentioned in the *You yang za zu* (Miscellanies of the Youyang Mountain) that the shell of the male nut had three spikes, that of the female only two.⁷⁴² This implied that if one made the right choice at the time of sowing, one expected or did not expect a harvest later on, for the presence of trees of both sexes close to each other was considered indispensable. It was at least necessary for the male and the female to be able to catch a glimpse of each other in a reflection on the surface of the water. Similarly, advice was given on how to make a female shoot without fruits productive, by inserting into its trunk a

⁷³⁷ Harlan (1992, pp. 73-4). They are *Canarium album* Blanco, Chinese olive; *Carya spp.*, Chinese hickories; *Castanea henryi* Rehd. et Wils., Chinese chestnut; *Chaenomeles spp.*, Chinese quince; *Corylus spp.*, Chinese hazelnuts; *Diospyros kaki* Linn., oriental persimmon; *Eriobotrya japonica* Lindl., loquat; *Ginkgo biloba* Linn., ginkgo; *Juglans regia* Linn., *Litchi chinensis* Sonner., litchi; *Prunus armeniaca* Linn., apricot; *Prunus persica* Stokes, peach; *Pyrus spp.*, Chinese pears; *Zizyphus sativa* Gaertn., Chinese jujube; to which should be added what was to become a fruit, the water 'chestnut', *Trapa natans* Linn.

⁷³⁸ For Geng Xuan (1974, pp. 403-4), these were peach trees (*tao*), the plum tree (*li*), the Japanese apricot tree (*mei*), the jujube tree (*zao*), the Chinese raisin tree (*Hovenia dulcis* Thunb.) (*ju* 枸), the Chinese hazelnut (*zhen*) and the Chinese chestnut *li*. The other two authors also recognised a *prunus* (*tang di* 唐棣), three quince trees (*mu gua*, *mu tao* 木桃 (*Chaenomeles lagenaria* Koidz.) and *mu li* 木李) (*Cydonia oblonga* Mill.), a pear tree (*sui* 榘 (*Pyrus calleryana* Decne)) and a wild vine (*yu*) (*Vitis sp.*). Lu Wenyu (1957) also identified *tiao* 條 as a pomelo (*Citrus grandis* Osbeck) and for *chang chu* 萇楚 chose *Actinidia chinensis* Planch., a choice corroborated by Xiang Xi (1986, p. 37).

⁷³⁹ Xin Shuzhi and Yi Qingheng (1983, p. 53). Peach (*tao*); plum, *Prunus salicina* Lindl. (*li*); Japanese apricot (*mei*); *Zizyphus jujuba* Mill. (*zao*); *Zizyphus spinosus* Hu (*ji*); *Corylus heterophylla* Fisch. (*zhen*); Chinese chestnut, *Castanea mollissima* Bl. (*li*); pear, *Pyrus sp.* (*sui* 榘); dusky pear, *Pyrus phaeocarpa* Rehd. (*du* 杜); birch leaf pear, *Pyrus betulafolia* Bunge (*gan tang* 甘棠); *Amelanchier asiatica* var. *sinica* Schneid. (*chang di* 常棣); *Prunus sp.*? (*tang di* 唐棣); *Prunus sp.* (*yu* 郁); *Prunus sp.* (*yu* 奠); *Hovenia dulcis* Thunb. (*gou* 枸); *Actinidia chinensis* Planch. (*chang chu* 萇楚); *Zanthoxylum spp.* (*jiao* 椒); *Morus alba* L. (*sang zhen*); Indian lotus (*he*); *Cucumis sp.* (*gua*); apricot (*xing*); *Pyrus sp.* (*li*); *Prunus japonica* Thunb. (*you* 枸); *Citrus grandis* (L.) Osbeck. (*you*); *Pyrus sp.* (*sha tang* 沙棠); *Chaenomeles sinensis* Koehne (*mao* 櫟); cherry (*xie* 楔 (*ying tao*)); *Torreya grandis* Fort. (*bi* 披); three species of *Rubus*; *Heleocharis tuberosa* Schultes (*shao* 芍); *Discoreaceae spp.* (*shu* 薯); *Euryale ferox* Salisb. (*qian*).

⁷⁴⁰ This text consists in 'orthographic word-lists intended for verbal exposition, connected with a continuous thread of text, and having some rhyme arrangements' (SCC Volume 6, Part 1, p. 562).

⁷⁴¹ Cited in the *Qi min yao shu*. See Mou Qiyu (1982, p. 201) (1) *yuan cai guo luo zhu mi liang* 園菜果蔬助米糧. 'Fruit-vegetable' translates *luo*, which designates the 'fruits of grasses', mainly represented by gourds. (2) *shu nu qian* 樹奴千 樹奴千無凶年.

⁷⁴² See p. 317 above.

piece of wood taken from a male tree. We have also noted that in pleasure gardens it was essentially the plants chosen for their flowers that had double flowers, while the trees that had delightful flowers but were a potential source of fruits very seldom had double flowers. Moreover, in Zhou Shihou's works or in the *Zhong yi bi yong*, they formed a separate category, that of *guo zi hua* 果子花 or simply *guo hua*, flowers-fruits; that is to say, trees highly valued for the beauty of their flowers, such as Japanese apricot trees and peach trees, but which were also expected to produce a harvest of fruits. As Craig Clunas has shown, pleasure gardens with blossoms that were much admired could also be serious fruit-producing units.⁷⁴³ A reading of treatises on agriculture or horticulture unsurprisingly reveals a desire to obtain abundant harvests of fruits of good quality. A number of texts offer information on ways of using fruits, in particular by treating them in order to preserve them for eating later on. I shall first be mentioning various recommended means of improving harvests and then describe certain techniques of preservation. I should note at this point that 'fruit' translates *guo* 果, a term that designates the produce of trees or certain herbaceous plants that have a sweet taste. This excludes 'fruits' in the botanical sense of the term, such as aubergines or courgettes, for example, but does include watermelons and sometimes even *dong gua* 冬瓜, wax gourd, which is both a 'vegetable' and a 'fruit'.

(ii) *The improvement of quality and productivity*

The process that was so highly recommended that it was considered by some to be able to take over the power of creation was grafting, which will be considered in detail in the next chapter. For the moment, I shall simply note its importance in the diffusion of varieties of fruit regarded as interesting. Chapter 37 (*juan* 4) of the *Qi min yao shu*, entitled 'Cha li shu' 插梨樹, 'the insertion of pear trees', devoted to grafting, describes how, when planning a 'long journey' of several hundred *li*, to preserve grafts by burning three or four inches of the lower part.⁷⁴⁴ Another method of improving fruit harvests also seems to have been practised. In the chapter relating to the cultivation of jujubes (Chapter 33, *juan* 4) we are told that 'on the first day of the year, at sunrise, one hits all the jujube trees with the back of an axe; this is called *jia zao* 嫁棗 [marrying the jujube tree]', and a note adds that without this the flowers do not produce fruit and that if one hits with the cutting blade, the fruits do not develop and fall off.⁷⁴⁵ For plum trees (Chapter 35, *juan* 4), various 'methods for marrying the plum tree' (*jia li fa* 嫁李法) and obtaining an abundant harvest are described. The first consists of the following: on New Year's Day or the fifteenth of the first month, one places stones and pieces of brick in the forks of the trees. The second recommends gently hitting the forks of the trees with a stick during the last month of the year and doing so again on the last day of the following month.

⁷⁴³ See in particular 'The Fruitful Garden', pp. 38 ff. in Clunas (1996).

⁷⁴⁴ Cf Mou Qiyu (1982, p. 205).

⁷⁴⁵ Cf Mou Qiyu (1982, p. 183).

The third method is to place at the fork the matches used for cooking the soup of the 'day of cold food'.⁷⁴⁶ Finally, the procedure involving hitting the trees with the back of an axe in order to increase the harvest of fruits is also recommended for apple trees (*lin qin* 林檎), although they are not expressly named.⁷⁴⁷

A perusal of the *Zhong yi bi yong* is very instructive and provides much information which crops up later on. I shall therefore be using this source in order to avoid repetition in later texts. We are told, for instance, that whether sown or planted, *zhong* 種, when the moon is growing, trees will produce many fruits, whereas the opposite will result if the sowing or planting takes place when the moon is on the wane. One is also advised to bury rotting meat among the seed that is sown, for otherwise the variety will not be maintained.⁷⁴⁸ For cuttings of excellent fruiting plants, the advice is to take cuttings one inch thick and one foot, five inches long, during the first ten days of the third month, and stick these into taros and plant them in this way. If taros are not available, radishes or turnips are also suitable. This procedure was rightly considered to be vastly superior to sowing.⁷⁴⁹ Inserting into the trunks of fruit trees small quantities of powdered stalactite was reputed to encourage abundant and beautiful fruit. The same procedure was used to regenerate old trees.⁷⁵⁰ When planting pomegranate trees, the advice was to set out a stone on to which one piled mud, which one then covered by another stone upon which one spread the roots of the tree; having covered these with more mud, the soil should be flattened by placing heavy stones on top of it.⁷⁵¹

The 'marriage' (*jia* 嫁) of trees is also mentioned. The text repeats what is written in the *Qi min yao shu* but with no reference to hitting the tree with the back of an axe:

On New Year's Day, before sunrise, cut into the jujube trees, the plum trees and the rest, using an axe; the fruits will be abundant and will not fall off. This is called *jia shu* 嫁樹. The same thing can be done on the last day of each month (*hui ri* 晦日) [of the luni-solar calendar]. *Jia li shu* 嫁李樹 [to *jia* the plum trees] consists in placing stones at the points where the trunk forks.⁷⁵²

What is the precise meaning of this term *jia* 嫁, which in the last example already has two technical senses? The first common usage is simply 'taking a husband'. Other passages in the text make it possible to tie down the semantic field somewhat. On the subject of the planting of mulberry trees in Zhejiang, it is said that *jia sang* 嫁桑 consists in 'cutting' (*zhan* 斬) the trees before planting them.⁷⁵³ Elsewhere, there are references to *jia qie* 嫁茄 in order to produce bigger aubergines;⁷⁵⁴ this consisted in removing the leaves and scattering them when the aubergine shoots began to

⁷⁴⁶ Mou Qiyu (1982, p. 197). This dish was a clear sweet broth of rice or millet with apricot kernels. See *ibid.*, p. 199, n. 3.

⁷⁴⁷ Mou Qiyu (1982, p. 214). ⁷⁴⁸ Wu Yi and Zhang Fu (1963, p. 28, respectively nos 59 and 58).

⁷⁴⁹ Wu Yi and Zhang Fu (1963, p. 27, no 57). ⁷⁵⁰ Wu Yi and Zhang Fu (1963, p. 30, no 72).

⁷⁵¹ Wu Yi and Zhang Fu (1963, p. 33, no 85). This calls to mind Li Yu's statement, 'By nature the pomegranate tree likes to be compressed'; see p. 476 in the 'Gardens' chapter.

⁷⁵² Wu Yi and Zhang Fu (1963, p. 31, no 75). ⁷⁵³ Wu Yi and Zhang Fu (1963, p. 20, no 28).

⁷⁵⁴ Wu Yi and Zhang Fu (1963, p. 20, no 29).

flower, and then surrounding the shoots with ash. In the light of these examples, we can see that the term does not correspond solely to one procedure. It seems likely that the choice of the graph 嫁, possibly originally as a homonym for 加, 'to augment', might derive from the idea that the arrival of a husband – even a rather brutal one – had to suggest that numerous children would follow.⁷⁵⁵ Another method involved 'wounding', *pi can* 批殘, the branches of a chestnut tree during the harvest, which was thought to guarantee a better crop the following year.⁷⁵⁶ However, the text also records methods of a gentler nature. In order to obtain a good harvest from a tree that was not bearing fruit, the advice was to sprinkle it, *po* 潑, with libations for the god of the soil (*she jiu* 社酒) or with broth made for the festival of the god of the soil (*she ri geng* 社日羹).⁷⁵⁷ This was an important date. On this day, 'pounding' (*chong* 春) the roots of the fruit trees that were producing poor harvests made it possible to obtain better results.⁷⁵⁸ The advice was also applied to peach trees with fruits that were abundant but dropped off; another remedy in such a case was to take a knife and cut several times all round the trunk; a similar procedure was used to prevent the appearance of wood worms after the first month in the year.⁷⁵⁹ To improve harvests from one year to the next, the fruits had to be picked using both hands as they began to ripen.⁷⁶⁰ It was considered best to pick the fruit when it was not quite ripe, for if picked ripe, they would become fibrous and in the following year the harvest would be poor.⁷⁶¹ Abnormal fruit was attributed to the presence of a venomous snake beneath the roots of the tree.⁷⁶² An absence of fruits was explained by a number of factors. For example, a smell of musk in the vicinity at the time of flowering was believed to render the flowers sterile.⁷⁶³ If a son in mourning or a pregnant woman spoiled a tree by touching it, that tree would, for several years, produce neither flowers nor fruit.⁷⁶⁴ The *Qi min yao shu* mentions a more objective cause: fruit trees will not produce if a white frost occurs at the time of flowering. To avoid that risk, it was advised to collect reserves of compost made from 'weeds' (*e cao* 惡草) in order to be able to burn them and create a lot of smoke on frosty nights.⁷⁶⁵ A way of gathering the fruit of the *Canarium* (*gan lan* 橄欖)⁷⁶⁶ was suggested, which made the fruits drop without it being necessary to climb up the tree; you simply knocked a bamboo nail into the tree or inserted salt under the bark.⁷⁶⁷

The chapters of the *Er ru ting qun fang pu* by Wang Xiangjin that are devoted to the production of fruit constitute another important marker for they mention most of the practices already described, with a number of variations. For instance, to produce abundant harvests of the fruit that remain on the tree, on the first day of

⁷⁵⁵ For a systematic list of the occurrences of the term in Chinese texts relating to horticulture, see Zhou Zhaoji (2000).

⁷⁵⁶ Wu Yi and Zhang Fu (1963, p. 36, no 104).

⁷⁵⁸ Wu Yi and Zhang Fu (1963, p. 35, no 101).

⁷⁶⁰ Wu Yi and Zhang Fu (1963, p. 34, no 92).

⁷⁶² Wu Yi and Zhang Fu (1963, p. 31, no 76).

⁷⁶⁴ Wu Yi and Zhang Fu (1963, p. 29, no 62).

⁷⁶⁶ *Canarium album* (Lour.) Rausch.

⁷⁵⁷ Wu Yi and Zhang Fu (1963, p. 31, no 76).

⁷⁵⁹ Wu Yi and Zhang Fu (1963, p. 35, no 100).

⁷⁶¹ Wu Yi and Zhang Fu (1963, p. 29, no 64).

⁷⁶³ Wu Yi and Zhang Fu (1963, p. 34, no 93).

⁷⁶⁵ Mou Qiyu (1982, p. 181).

⁷⁶⁷ Wu Yi and Zhang Fu (1963, p. 31, no 81).

the year at the fifth watch and on the fifth day of the fifth month, *duan wu ri* 端午日, one should strike all the fruit trees without exception with an axe and, at the time of the festival of the god of the soil, one should pound the earth under the roots of the trees. These methods can also be adopted for trees that do not produce fruit. Similarly, on New Year's Day or at the time of *duan wu*, at cock-crow one should manure all the trees to protect them against insects and ensure an abundant harvest. It is also recommended to pile up weeds to burn at the time of the frosts that will be sure to occur in the night following a rainy day that started with clear weather and a north wind. It is not advisable to hoe too much or to leave cavities at the bases of the trees, for on the one hand it encourages the growth of weeds that attract insects, and on the other it creates bad drainage that is harmful to the roots when it rains. Three ways of getting rid of the insects that attack trees are suggested: catch them in little wire nets, or smoke them out by burning sulphur or arsenic sulphide or by burning paper soaked in tung oil.

When taking cuttings from fruit trees of all kinds, the best time is the first ten days of the third month. The slips must be as thick as a finger and three feet long; stick the base into a large taro or turnip and plant this. Three years later the tree is formed. The author also emphasises the importance of following the nature of plants (*shun xing* 順性) which is linked to the environmental conditions of their region of origin. For instance, trying to grow southern plants in the north and vice versa cannot produce good results.⁷⁶⁸ Another word of wisdom is not to exhaust trees. Given the fact that after a year with a good harvest the trees will produce fewer fruits, if one has, for example, thirty peach or plum trees, in the following year remove the flowers on half the trees so that they will only produce fruit one year later. Precise advice is also given on watering. It is not good to water with manure at the time when buds are appearing or when young shoots are developing; only use water that is slightly enriched. At the time of flowering or in very hot weather, only use pure water. The manure should not be recent. To make enriched water, use a mixture of one part manure to two parts water.

An unusual explanation is provided for the use of the term *jia*, 'to take a husband' – the meaning of which we have already explored a little – in the expression *jia guo* [*shu*] 嫁果[樹]. Noting an apricot tree that had abundant blooms but produced no fruit, an old procuress laughed and said, 'Next spring we shall attend the marriage (*jia*) of this apricot tree'.⁷⁶⁹ In midwinter she came, bringing a jug of wine for sacrifices, saying that it was necessary to pour libations for the marriage and hang a red dress on the tree; after making some wishes and pouring libations three times, she departed. The following year, there was an extraordinarily rich harvest. The red dress confirms the sexualisation of the tree, which is clearly a wife and future mother.

⁷⁶⁸ An example of success has, however, been cited above. See p. 436.

⁷⁶⁹ So the tree must have been considered to be of the feminine sex.

Wang Xiangjin also refers to the importance of the circumstances in which fruits are gathered. If one takes the fruit in both hands to gather them when they start to ripen, the harvest will increase from year to year. If a person wearing mourning clothes picks the fruit, there will be no crop the following year. If a burglar picks the fruit and eats them, the harvest will be eaten by the birds.

As a general rule in the cases of the majority of texts, vegetative reproduction was advised rather than the sowing of seed, and quite a few noted that the fruits that resulted from the sowing of seed might differ from the fruits from which the seeds were taken. This extremely pertinent remark supports Edward Lee Greene's comments on popular lore that sometimes precedes by many years the scientific knowledge that explains the adoption of certain practices. In this precise case, in the absence of any understanding of genetics, both peasants and gardening literati had noticed, certainly very early on, that the flowers and fruits of a particular variety could either be very different or else very similar, depending on whether they had been produced by a plant grown from seed or from cuttings of the mother plant. Depending on the height of the trees, one increased the growth by layering, by grafting or by cuttings. In the latter case, one could either take slips which were planted as described above or else one just took cuttings at random.

(iii) *The preservation and transformation of fruits*

The *Zhou li* (Tian Guan Zhong Zai, Xia) Bian Ren 周禮, 天官冢宰.下. 籩人⁷⁷⁰ records that the priest responsible for sacrifices presented in bamboo containers, *bian* 籩, would offer, after meat products and those derived from grains, first fruits (jujubes, chestnuts, peaches, apricots, dried Japanese apricots) and nuts, then water caltrops, euryale seeds and slivers of dried chestnut.⁷⁷¹ This text is the first to attest to the preparation of dried fruits in China.⁷⁷² As three specific terms are used, *gan* 乾, *lao* 棗 and *fu* 脯, they probably each refer to different processes. The first has the wide sense of 'dried by the sun'. The primary sense of the third is 'meat cut up and dried'; by extension, it also applies to preparations of plants and by analogy probably to a product that is dried after being cut into pieces. The existence of a specific term *lao* for the Japanese apricot suggests either that these fruits were prepared in a special way or simply that they played a particular role. The *Shuo wen jie zi* defines *lao* as *gan mei zhi shu* 乾梅之屬, 'of the category of dried Japanese apricots', but does not indicate how they were used.⁷⁷³ It is perhaps rather surprising that, if it is a product that is already dried, the text of the *Zhou li* should specify that it is dried. One satisfying explanation is provided by Xu Hao 徐灝 in a commentary on the *Shuo wen jie zi*, the *Shuo wen jie zi zhu jian* 說文解字注箋, which specifies that

⁷⁷⁰ Cf Lin Yin (1985, p. 54).

⁷⁷¹ *Kui shi zhi bian, qi shi zao li tao gan lao zhen shi. Jia bian zhi shi, ling qian li fu.* 饋食之籩,其實棗栗桃乾榛棗實.加籩之實.菱芡栗脯.

⁷⁷² Cf Min Zongdian (1985, p. 89).

⁷⁷³ Cf Ding Fubao (1928, p. 428a).

lao designates a way of preparing Japanese apricots or peaches that are stewed with aromatic herbs.⁷⁷⁴ It must have been possible to consume *lao* just as they were after being cooked or dried; hence the detail provided in the *Zhou li*. Min Zongdian reports that these *lao* are the most ancient preparations of fruits.⁷⁷⁵ Drying by the heat of the sun or that of a fire was thus the first process for the preservation of fruits attested by the texts.

The fourth *juan* of the *Qi min yao shu* (c.+535) by Jia Sixie, various parts of which concern fruit trees, provides several recipes based on methods of preserving fruit products. All the recipes involve a period of drying in the sun accompanied by various methods of preparation. Let us start with the 'method of drying jujubes' (*shai zao fa* 曬棗法).⁷⁷⁶ After clearing the ground, one spreads out a piece of material onto which is placed a wicker tray used for the raising of silkworms. The fruits placed on this tray must be gathered up and set out again twenty times a day. They are left spread out overnight, for a white frost can speed up the drying. After five or six days, those that are red and tender are put on raised supports where they are left until they are completely dry. Those that are damaged must be weeded out and the process must be repeated for those that are not quite dry. Another process, cited from a lost *Shi jing* 食經 the 'Classic on Foods', explains how to 'make dried jujubes' (*zuo gan zao fa* 作乾棗法) by a method different from the one described above. After three days and three nights out in the open air, the jujubes finish drying under cover. They are then placed in a pot sealed with mud, after being sprinkled with alcohol, using one *sheng* 升 per one *dan* 石 of fruits, roughly one litre per hectolitre. The text states that the jujubes can in this way be kept for several years. It was also possible simply to dry jujubes that had been cut into slivers. In this case one obtained *zao fu* 棗脯, 'dried slices of jujube'. A similar process is indicated for apples. To make *nai fu* 奈脯, cut in half apples (*nai*)⁷⁷⁷ that are ripe and dry the halves in the sun. Two methods are given for preserving grapes, grape by grape or in whole bunches. In both cases, it was recommended to pick them when very ripe. Having been carefully de-pipped, the individual grapes were mixed with honey and fat, then the whole lot was heated to boiling point four or five times and, after draining, was dried in the shade.⁷⁷⁸ That was how 'dried grapes' (*gan pu tao* 乾蒲萄) were prepared. For whole bunches, one had to dig a ditch in the earth and place in it a container with holes pierced in the bottom and into these the stems of the bunches were placed. To preserve plums (*li*) picked when yellow in the summer, one mixed them with salt and they were then dried in the sun, flattened out from time to time. Before using them as an accompaniment to alcoholic drinks, they had to be washed in boiling water and dipped into honey.⁷⁷⁹ Three ways of preparing Japanese apricots are described, for the 'natural' white ones (*bai mei* 白梅), the black ones (*wu mei* 烏梅), and a flour of apricots and plums (*mei li chao* 梅李麪).⁷⁸⁰

⁷⁷⁴ Quoted in Ding Fubao (1928, p. 428a). ⁷⁷⁵ Cf Min Zongdian (1985, p. 89).

⁷⁷⁶ Mou Qiyu (1982, pp. 183-4). ⁷⁷⁷ *Malus prunifolia* (Willd.) Borkh. (Yu 1979, p. 102).

⁷⁷⁸ Mou Qiyu (1982, p. 192). ⁷⁷⁹ Mou Qiyu (1982, p. 197). ⁷⁸⁰ Mou Qiyu (1982, p. 200).

To prepare white apricots, pick them at the time when the stone forms, set them to macerate overnight in a pickling brine, in the morning dry them in the sun, and repeat this process ten times. To prepare black apricots pick them at the same point. Place the fruit in a bamboo steamer and steam them until they are dry. As for the third recipe, this is way of preparing damaged Japanese apricots and plums. Having picked them, place them in a bowl and squash them, then pass them through a strainer. Spread the thick juice that is obtained in a dish exposed to the sun, to dry it. Then cut them into shavings which, added to water, produces a gruel or which can be mixed with rice (*mi chao* 米麪). Other recipes for such ‘flours’ are also suggested. To make *nai chao* 奈麪, pick apples (*nai*) that have fallen and are bruised, put them in a jar, close it tightly to keep the flies out. After six or seven days, when they are thoroughly rotten, bathe them in an alcoholic liquid and stir thoroughly until the consistency of a gruel of cereals is obtained. Add water, stir again, pass through a sieve to remove skin and pips. Wait for a long time, decant it, eliminating the juice; add water again, and stir; as earlier, stop stirring when the bad smell has gone. To eliminate the juice, spread a cloth over the top and absorb what remains of the juice by adding ash, as one does when preparing rice noodles (*mi fen* 米粉). When there is no more juice, cut into slices as thick as a comb and dry them in the sun, then reduce to a powder. To prepare *lin qin chao* 林檎麪,⁷⁸¹ when the apples (*lin qin*)⁷⁸² are red and ripe, open them with your hands, remove the pips, the core and the stalk (*di* 蒂), and expose to the sun until desiccated. Grind or pound, sift; repeat with the larger pieces until it is all reduced into a fine powder which, when mixed with water, produces a fine sauce. If the stalks are left in it is very bitter; if the cores are left in it is very acid. To preserve pears (*li* 梨), pick them after the first white frosts. Then set them out – protected from humidity – on the bottom of a box in a deep hole dug in the floor of a room, without covering them.⁷⁸³ Chestnuts can be preserved in all sorts of containers; they can also be dried in heated fine sand. Treated in this fashion they were reputed to preserve their ability to germinate until the following spring.⁷⁸⁴ As for kakis, there were some that dried on the tree and others that were gently dried by heating in a receptacle placed on the fire. To preserve them, it was also possible, having picked them when ripe, to dip them three times in ashes mixed with water. When the liquid had dried, they had to be placed in a container. Ten days later, they were ready for eating. For quinces (*mu gua*), the advice was to peel them first, then boil them until thoroughly cooked, then place them in water, cut them into round slices, and finally plunge them into a mixture of salt and honey; for one hundred quinces, three litres of salt and a bushel of honey were necessary. They were placed out in the sun during the day and replaced in the liquid in the evening. Finally, they were preserved in the liquid honey that remained.

⁷⁸¹ Mou Qiyu (1982, p. 215).

⁷⁸² *Malus asiatica* Nakai = *Malus prunifolia* Borkh. var. *rinki* Relider. (Yu 1979, p. 100).

⁷⁸³ Mou Qiyu (1982, p. 205). ⁷⁸⁴ Mou Qiyu (1982, p. 210).

It is noticeable that preservation methods were used both for perfect and for damaged fruit. For the former, the simplest method was to cut them into slices, *fu*, and simply dry them in the sun. Other procedures involve the heat of the sun together with preserving substances such as honey, alcohol and salt; bunches of grapes, picked when very ripe, were preserved undercover, away from the sun. Other procedures, recorded in a collection of notes in the Song period, the *You huan ji wen* 游宦紀聞 (Things Seen and Heard on My Official Travels) by Zhang Shinan 張世南, describe how to preserve whole fruits intact. The first recipe, which the author borrows from another text, the *Gui tian lu* 歸田錄 (On Returning Home) (+1067) by Ouyang Xiu 歐陽修 (1007–72), concerns large kakis that are initially very bitter and hard. If, in the middle of 100 kakis – no doubt placed in a huge pot – one placed a Chinese quince (*ming zha* 檳榔),⁷⁸⁵ the kakis turned red and became soft and could be eaten. The Chinese quince could be replaced by the fruit of another quince tree, *wen bo* 榲桲.⁷⁸⁶ Zhang Shinan gives another recipe for preserving kumquats. He says that in Jiangxi, kumquats (*jin ju* 金橘) grow everywhere.⁷⁸⁷ There are also fruits that are known as *jin gan* 金柑,⁷⁸⁸ inferior in quality but with a sweet taste. This fruit, which was subject to greater and greater cultivation, unfortunately did not keep for very long. To remedy this, the advice was to preserve them in mungo (*liu dou* 莢豆) seeds.⁷⁸⁹ The reason given for this is the respective natures (*xing* 性) of the two, within the framework of the theory of the Five Phases (*Wu xing* 五行): the kumquats were hot (*re* 熱) and the mungos were refreshing (*liang* 涼).⁷⁹⁰ Clearly, in this case the fruits' preservation is explained by the 'resonance' between complementary categories (*xiang gan lei* 相感類).

Now let us consider the advice that Wang Zhen gives in his book on agriculture, the *Nong shu*. He reports that he has heard it said that in the Gansu region there are muskmelons (*tian gua* 甜瓜)⁷⁹¹ as large as headrests with flesh that is sweeter than honey. One separates the skin to let it dry a bit in the sun; when it is still supple and resistant, it is placed in the earth to preserve it.⁷⁹² The taste is sweet and delicious. Melon seeds are dried in the sun; then the kernels are drawn out and these make a delicious accompaniment to tea, indeed a fine food.⁷⁹³ Among the many varieties of pear, those produced in Xilu 西路 were particularly popular. After being peeled, they were cut into slices and then dried gently in a receptacle placed on the fire. The result of this process was known as 'pear flowers', *li hua*, and the sweet taste, judged to be excellent, was offered as tribute to the emperor.⁷⁹⁴ Wang Zhen then suggested a method for preparing 'white plums', *bai li* 白李:

⁷⁸⁵ This term designates the fruit of the *mu gua*, *Chaenomeles sinensis* (Thouin) Koehne.

⁷⁸⁶ *Cydonia oblonga* Mill. Cited from Zhang Shinan (1958, p. 574). A similar procedure was described to me in Beijing in 1964. When kept for several days in a sealed receptacle along with pears that were sold locally, the kakis lose their bitterness.

⁷⁸⁷ *Fortunella margarita* (Lour.) Swingle.

⁷⁸⁸ *Fortunella japonica* (Thunb.) Swingle.

⁷⁸⁹ Synonym of *liu dou* 綠豆. *Vigna radiata* (L.) R. Wilczek (= *Azuki radiata* (L.) Ohwi, *Phaseolus aureus* Roxb., *Phaseolus radiatus* Lour.).

⁷⁹⁰ Zhang Shinan (1958, p. 575).

⁷⁹¹ *Cucumis melo* L.

⁷⁹² Wang Yuhu (1981, p. 95).

⁷⁹³ Wang Yuhu (1981, p. 96).

⁷⁹⁴ Wang Yuhu (1981, p. 126).

Use summer plums, good and yellow. Pick them and rub them with salt, which will render them more juicy. Then set them to dry in the sun with the salt, until they grow soft, then flatten them with your hands, dry them in the sun again, then flatten them more. Since exposing the plums dries them up, for them to serve as an accompaniment for alcoholic drinks it is necessary first to pour boiling water over them, drain them and then soak them in honey.⁷⁹⁵

He repeats the recipes for the preparation of Japanese apricots that were given in the *Qi min yao shu*, pointing out that the *wu mei*, the black apricots, are medicinal and so should not be used as condiments. He adds another recipe taken from the *Shi jing* 食經, the 'Classic on Foods': the 'method of preserving Japanese apricots in Sichuan'. This consists in selecting the largest of the fruit, peeling them and drying them in the shade, avoiding all draughts; then placing them in a pickling brine and, after two nights, discarding the salty liquid, leaving them to steep in honey for about a month, topping up the honey when necessary. After this treatment, the fruits may be kept for a year. Finally, Wang Zhen provides a recipe for a 'flour made from Japanese apricots and plums' (*mei li chao* 梅李麪). It is worth pointing out that in a note, *chao* is glossed by *qiu* 糗, which means 'sticky cooked cereal that takes the form of clusters or lumps'.⁷⁹⁶ Here is the method for making it. Choose, for preference, fruits that are ripe and a little bruised. Crush them in a receptacle, filter the juice through a new piece of fabric and allow to dry in the sun for one day. 'Squeeze in your hands' and slice into thin pieces (*gua* 刮). This can be mixed with water to make a sauce or with a flour of grains of grilled rice (*mi chao* 米麪).⁷⁹⁷ The treatments for apples, *nai* and *lin qin*, of the *Qi min yao shu* are reproduced with no omissions or alterations,⁷⁹⁸ as are those for jujubes. Mulberries are considered to be excellent once they are dried when fully ripe; the fruits of good years become subsistence food in periods of famine. As well as reproducing passages from the *Qi min yao shu*, he explains how to make *shi gan* 柿乾, dried kaki cakes. The kakis (persimmons) are picked before they are ripe, stripped of their thick skins, squashed flat by hand and set to dry in the sun. Once they are dry and have been placed in a pot, after a while a 'frost' appears on the surface. At this point they can be eaten. The white powdery 'frost', which is as sweet and refreshing as honey, is kept for treating aphtha and sore throats.⁷⁹⁹ Next Wang Zhen explains how to dry litchis. Having exposed them to the sun for several days, set out on bamboo fruit trays, until their colour changes and their stone dries, then they are gently roasted until the stone is very hard and completely dry. When preserved in small bamboo cages wrapped in bamboo leaves

⁷⁹⁵ Wang Yuhu (1981, p. 129).

⁷⁹⁶ Cf anon. (1965, p. 389).

⁷⁹⁷ Wang Yuhu (1981, p. 130).

⁷⁹⁸ Wang Yuhu (1981, pp 132–3).

⁷⁹⁹ Under the name *shi shuang* 柿霜, 'kaki frost', this powder is cited in the *Ben cao gang mu* and is still included in *materia medica*. See anon. (1977b, Fig. 3189). The description given in Porter Smith (1969, p. 152) corresponds to that in Wang Zhen: 'This is prepared by taking the skin off the fruits, and then exposing them to the sunlight by day and the dew by night until they are dry, when a whitish powder will have gathered upon them. The persimmons dried in this way are called 柿餅 *shi bing*' – persimmon cakes. Read (1936, no 188, p. 48) describes it as 'the sugary excrescence from the dried fruit'.

(*ruo* 箬)⁸⁰⁰ they can be taken on long journeys. In this form they are called *li jin* 荔錦, 'litchi brocade'; if one takes the flesh of the fresh fruit and cooks it in honey until its consistency when bitten is that of powdered sugar, the name is *li jian* 荔煎, 'fried litchi'. Wang Zhen insists on the fact that fresh litchis 'in four or five days lose their aspect, perfume, colour and taste'. The preparation of longans (*long yan* 龍眼) is similar to the last recipe except that, before exposing them to the sun, they must be left for one night to steep in pickling brine along with Japanese apricots, *mei lu* 梅鹵. *Canarium* fruits, *gan lan* 橄欖, are preserved in honey and, as it is not easy to climb the tree to pick them, an account is given of the same method as that described in the *Zhong yi bi yong*: make a square hole one inch wide in the root and fill it with salt; 'in one night all the fruits will fall of their own accord'. The preparation for pomegranates is very simple provided one knows how to choose the ones to pick. Only the fruits that have excrescences – 'horns' (*leng jiao* 稜角) – are suitable, the others would rot. They should be simmered in water and then placed in a new porcelain receptacle. Wang Zheng gives a brief method for preparing quinces (*mu gua* 木瓜) before they are preserved: once they are peeled, they should be blanched to remove their acidity, then cook them in honey. He also suggests another way of eating them. Having removed the pips, steam them and reduce them to a purée, add some honey and ginger and cook them gently for a while, then 'drink' the result. Those are the recipes given in Wang Zheng's treatise.

Wang Xiangjin devotes entries of two kinds to the subject of fruit preservation in his *Er ru ting qun fang pu* 二如亭群芳譜. On the one hand he provides general information in two short monographs presented as a preface to the 'Treatise on Fruits' *Guo pu* 果譜. On the other, in the pages that follow, in which he gives a detailed description of the cultivation of each kind of fruit, he sometimes devotes a particular rubric to the preparations that make it possible to preserve fruits in general for quite long periods. Let us start with his general remarks. Mulberries, tangerines (*ju*), peaches and pears should be picked with their stems when they are 70 per cent ripe. Stick the stems into a turnip or a big taro. Wrap the fruits in paper or dry straw to protect them. Put them into a new earthenware pot so that they do not suffer from draughts. When they are eaten, in the following year, they are as if freshly picked. Fresh litchis and longans are picked when ripe; they are placed in dry receptacles to steep in honey; seal with oiled paper to prevent water leaking in. For red jujubes, take a new jar and brush it out; sprinkle the interior with rice vinegar; when the interior is dry, rub the neck with sesame oil. Arrange a layer of foxtail millet and a layer of jujubes and cover well with straw so that the fruits do not touch. In this way it is possible to preserve them for a long time, with no parasites. Euryale (Gorgon waterlily) (*ji tou zi* 雞頭子) seeds, having been boiled, are left to steep in 'fang feng 防風 water';⁸⁰¹ in this way they can be kept for over a month.

⁸⁰⁰ *Indocalamus tessellatus* (Munroe) Keng f. A small bamboo the leaves of which have a wide limb and so are used to wrap objects or food. See Geng Yili (1965, p. 15).

⁸⁰¹ *Saposhnikovia divaricata* (Turcz.) Schischk, an Umbellifer (Apiaceae) that possesses antibacterial properties.

Almonds and pine kernels are preserved in sacks of rough material hung in a well-aerated space. Pomegranates, picked with their stems attached, are preserved in new earthenware jars well sealed by several layers of paper. Then a number of different preparations are described.⁸⁰² 'Sticky jujubes' (*jiao zao* 膠棗) can be obtained from red jujubes that are dried in the sun, then laid out in the air on a bamboo tray; then they are dried by smoke when they are mixed in with straw. Plums that have been dried after straining mixed with magnolia leaves (*pu zi* 朴子)⁸⁰³ are called *jia qing zi* 嘉慶子. The seeds of lotus are simply dried in the sun. It is possible to preserve all kinds of fruit after they have been dried in the sun. When the fruit are cooked, cut the large ones into thin slices and leave the small ones whole. They are boiled in water that is then discarded and they are left to soak in fresh water for one night. Then squeeze them out, dry them and place them in a porcelain receptacle. Heat some good honey gently. When it is on the point of boiling, pour it into the receptacle. After seven days the honey is good and liquid. Now move the fruit into another dish. Heat the honey to evaporate all the water, pour onto the fruit, adding new honey. Only heat the honey, not the fruit. Repeat these operations two or three times. By the end of all this, the fruit is perfectly preserved in honey.

Here are some specific recipes for various kinds of fruit. Apples (*pin guo* 蘋果)⁸⁰⁴ picked when ripe can be preserved in a cool cellar until the summer. Their taste even improves. In the autumn, when cut into slices that are then dried in the sun, they can be kept for a whole year and still taste just as good.⁸⁰⁵ Apricots can be picked even when overripe; they should be crushed in a basin, then the crushed fruit is passed through a sieve and the thick liquid is spread out on a platter and set to dry in the sun. One can then use portions of it to mix with water and make a sauce. The same recipe can be used for plums.⁸⁰⁶ When fresh kakis are placed in a receptacle they ripen on their own and lose their bitterness and become as sweet as honey.⁸⁰⁷ Chinese hawthorn (*shan zha* 山楂)⁸⁰⁸ can also be preserved. Choose ripe ones, wash them well, then remove the skins, stones, and white bits, smash them thoroughly and add white sugar until the acidity has gone. Add a little white alum powder to restore the colour. Place in a steamer and steam until it coagulates. Eat as fruits. They can be used as snacks. Another way of preserving them is to put the fruits into honey after steaming them and removing the skin and stones. The quantity of honey, as above with the sugar, depends upon the degree of the fruits' acidity. Another method is to quarter the fruits, add ginger and salt, mix together and steam.⁸⁰⁹ Bayberries (*yang mei* 楊梅) can be preserved. For three pounds of fruit, add one ounce of salt, leave for half a day; bring to the boil then leave overnight; add two pounds of sugar, a good handful of mint leaves (*bo he* 薄荷) and stir carefully;

⁸⁰² Fan Chuyu et al. (1994, Volume 3, p. 329).

⁸⁰⁵ Fan Chuyu et al. (1994, Volume 3, p. 344).

⁸⁰⁷ Fan Chuyu et al. (1994, Volume 3, 378).

⁸⁰⁹ Fan Chuyu et al. (1994, Volume 3, 379).

⁸⁰³ *Magnolia officinalis* Rehd. et Wils.

⁸⁰⁴ *Malus* sp.

⁸⁰⁶ Fan Chuyu et al. (1994, Volume 3, p. 371).

⁸⁰⁸ *Crataegus pinnatifida* Bge.

dry under a hot sun.⁸¹⁰ For litchis and longans, Wang Xiangjin copies word for word the instructions given by Wang Zhen's *Nong shu*, with one minor addition for the preparation of litchis. For litchis with salted Japanese apricots, he advises the addition of Chinese hibiscus flowers (*fo sang hua* 佛桑花)⁸¹¹ to impart a fine red colour to the paste obtained after drying. He notes that this can be kept for three or four years.⁸¹² The various preceding rubrics are arranged under the title *zhi yong* 製用, 'fabrication-use', but for chestnuts a new rubric appears, *shou cang* 收藏, 'collection-preservation'. The first recipe concerns the preservation of fresh chestnuts. They should be collected after the first hoarfrosts, and placed in water to eliminate those that float. Drain the rest, wipe them carefully and leave them in the sun for a while. Pass them through warmed sand to complete the drying and leave them in the fresh air. Then, in a round wine vessel with a small opening, lay out layers of chestnuts each covered by a layer of sand about seven or eight *fen* (two or three centimetres) thick. When it is full, press bamboo leaves (*ruo* 箬) on top. Seal the opening with clay and turn the container upside down on a well-swept floor. If there are no stores of alcoholic drinks near by, the chestnuts will keep until the following spring. Another method is to soak the chestnuts for two nights in salted water (two pounds of salt for one *dan* 石⁸¹³ of fruit); then drain them and dry them in the sun. Mix with two *dan* of sesame, stir well and place in containers. These chestnuts will keep for a very long time and will be very tender and tasty when eaten. A third method is also described: after mixing one pound of salt in enough water to contain one bushel of chestnuts, leave the chestnuts to soak for one night. Drain them, dry them in a bamboo basket or a sack made from a rough hemp tissue hung up in the dark in a well-aired space. Shake once or twice. The chestnuts will keep intact until the following spring.⁸¹⁴

Chapters 29 and 30 of the *Nong zheng quan shu* by Xu Guangqi are devoted to the cultivation of fruit trees and, as a general rule, at the end of each rubric, there are descriptions of procedures for preserving the fruits. Essentially, the text is made up of citations from earlier works, in particular the *Qi min yao shu* and the *Qun fang pu*. In the case of jujubes, the reader is reminded that they should be picked when they are completely red. The best ones are those that fall when the tree is shaken. In those that are picked when only half-red, the flesh is not completely formed; once they have been dried they are yellow in colour and have a wrinkled skin; the taste is not as good as that of the fresh ripe fruit. If the fruit that are red are left on the tree for too long, their skin is spoiled because of attacks from the birds. One way of preserving them is to pick them early in the morning with the aid of a small leafy branch that will not damage the fruit, which is then left in a well-aired place to allow the dew to evaporate. They are then cleaned with a brush dipped in pure clean water, dried on a fire and left to cool. Otherwise one can use clean straw dried in

⁸¹⁰ Fan Chuyu et al. (1994, Volume 3, 380).

⁸¹² Fan Chuyu et al. (1994, Volume 3, p. 388).

⁸¹⁴ Fan Chuyu et al. (1994, Volume 3, p. 410).

⁸¹¹ *Hibiscus rosa-sinensis* L.

⁸¹³ Ten bushels, roughly fifty litres.

the sun and then allow the fruit to cool. In a new jar, smelling neither of alcohol nor of oil, put alternate layers of herbs and fruit and seal hermetically. The jujubes remain 'fresh' until the following year. The text then returns to the preparations described in the *Qi min yao shu*. For peaches, the text of the *Ben cao gang mu* is used. The fresh fruit must be cut into slivers, then, after being blanched, must be put to dry in the sun. It is also texts from the *Ben cao gang mu* that are mainly used for the plums. The reader is told that these must be salted and dried in the sun, preserved in sugar and kept in honey. Then comes the recipe for 'white plums' from Wang Zhen's *Nong shu*. The *Nong shu* is also cited for the preparation of salted Japanese apricots preserved in honey, a method peculiar to Sichuan. A few more recipes are added to those for *bai mei* and *wu mei* from the *Qi min yao shu*. A preparation for 'a sauce made from Japanese apricots' (*mei jiang* 梅醬) which involves simply pressing ripe fruit in order to extract the juice, which is then dried, provides, when mixed with water, a drink for the summertime. According to Lu Ji's commentaries on the *Shi jing*,⁸¹⁵ this dried acid juice was cut into slices and used as an aromatic condiment in the preparation of thick soups (*geng* 羹). Xu Guangqi notes two ways of ripening kakis, either by leaving them in a pot until they take on a vermilion colour or by placing them in a receptacle full of water for several days. He also cites the procedure described by Wang Zhen for drying kakis, which he calls 'kaki cakes' (*shi bing* 柿餅). To preserve them, he recommends picking them when ripe, washing them three times in a mixture of water and ashes, draining off the moisture and placing them in a pot. It is also possible to produce 'black kakis' (*wu shi*) by smoking them, to dry them.⁸¹⁶ The importance of the preservation of litchis is emphasised – as it was by Wang Zhen – since large quantities of these were exported overland or by sea from what is now Fujian both to foreign countries – Korea, Japan, Ryukyu and so on – and to various regions of China. There must have been a heavy demand for them, for Xu Guangqi even states that as soon as the trees came into flower, merchants signed contracts with the owners of plantations. On the subject of cherries, he simply declares that they can be eaten preserved by salt and stored in honey. Likewise, he does not go into detail on the subject of the preservation of Chinese arbutus berries (*yang mei*), but simply remarks that they are good when preserved in salt, soaked in honey, kept in sugar or cooked in some alcoholic liquid. So clearly these various methods were all well known. He notes the importance of mulberries from mulberry trees which produce an abundant crop. He writes, 'when they are black, the trees are shaken to make the fruit fall and it is placed on trays, to dry. In normal times they can be eaten as ordinary fresh fruit; in years when the harvests are bad, they prevent famines'.⁸¹⁷

The various methods of preservation considered above show clearly that people were keen to profit from fruit well beyond the period of their ripeness, but that is not to say that the consumption of fresh fruit was not greatly appreciated. It is well

⁸¹⁵ *Mao shi cao mu niao shou chong yu shu* 毛詩草木鳥獸蟲魚疏 (+254).

⁸¹⁶ Xu Guangqi, Shi (1979, pp. 779–80). ⁸¹⁷ Xu Guangqi, Shi (1979, p. 813).

known that Yang, the concubine of Emperor Ming Huang of the Tang dynasty, was passionately fond of fresh litchis. Every year, at harvesting time, they were brought to her from the regions where they were produced all the way to Changan, thanks to the speed of the relays of horsemen, who, as Du Fu lamented in a famous poem, never hesitated to exhaust their mounts that galloped at full speed on their mission. How could such a fragile fruit be preserved for long enough? Possibly by making room for them in the compartments in between the nodes in freshly cut thick bamboos still carrying their leaves, which were replaced with new bamboo lengths in the course of the journey. Each fruit, the stem of which had been sealed with wax, needed, moreover, to be wrapped in paper.⁸¹⁸ Edward Schafer also tells us that ‘the watermelons at Khwārizm, exported in the 9th century, were packed in snow inside leaden containers’. Clearly, though, the cost of such procedures must have made them prohibitive for most people, so these can only have eaten fresh fruit on the spot where they were produced or very close to it.⁸¹⁹

Now let us consider what was considered to be the best means to obtain flowers or fruit of excellent quality: grafting.

(5) GRAFTING AND VEGETATIVE PROPAGATION

In this study of the history of grafting in China I shall not dwell on the possible or conjectured origins of this group of techniques, such as the existence of different species of tree that appear to be but one or the phenomenon of spontaneous grafts. In the first of those two cases it is a matter of plants the seeds of which, scattered by the wind or birds, germinate in cavities or forks of already existing trees (Fig. 173).⁸²⁰ As for spontaneous grafts, it is useful to remember the interpretation given in China to this well-known and common phenomenon of union between two different plants, mostly trees, through their trunks or branches.⁸²¹ It was referred to as *lian li* 連理, ‘uniting the principles’, and was considered to be a manifestation of the virtuous behaviour of the ruler, and a symbol of good fortune. As Ban Gu 班固⁸²² remarks, ‘when virtue reaches plants, the scarlet grass flowers and trees unite their principles’. Such a union, and likewise one between the branches of two trees, is also a poetic image used to evoke the love between a couple or sentiments of fraternal love.⁸²³ From a historical point of view, it was the manifestation of virtue – that is to say, the virtue of the prince – that was considered to be important since officials were supposed to report such phenomena to the Court whenever they occurred. As the text that accompanies a representation of two trees linked in this fashion on one

⁸¹⁸ See Schafer (1963, pp. 119–21).

⁸¹⁹ For the sophisticated methods of transporting scions and keeping them fresh, as described in *Nong sang ji yao*, see the following chapter, p. 522.

⁸²⁰ Examples are given in Pease (1933, pp. 72–4, in particular) and in Zhou Zhaoji (1994, 266–7).

⁸²¹ For photographs of many examples, see Baldwin (1938).

⁸²² Ban Gu, *Bai hu tong* 白虎通, Feng Chan: *de zhi cao mu zhu cao sheng, mu lian li* 德至草木朱草生木連理.

⁸²³ *Lian li zhi* 連理枝 or again *Lian zhi* 連枝.



Fig. 173. A young maple sapling growing in the fork of a cedrella tree in a Parisian street. Author's photograph.

of the stelae of the Wu Liang shrine (Fig. 109) puts it, 'When the virtue of the emperor spreads in all directions, there is but one single family, and then the "union of principles" (*lian li*) appears'. Tan Bi'an⁸²⁴ reports 254 occurrences of such relations that are mentioned in the *Twenty-Four Histories*. However, when he analysed the statistics of these recordings, he noted a very high proportion of incidents of this phenomenon during the most troubled periods of Chinese history and he concludes that these unions of trees may not all have been spontaneous but could have been true grafts deliberately effected by proximity. With such a proof of his virtue, a prince could probably prove his legitimacy to be greater than that of other pretenders. To what extent might such a natural phenomenon have led human beings to practise more sophisticated forms of grafting in a context no longer political, but horticultural? That remains an open question. The fact that, as we shall see, grafting by proximity is not mentioned until relatively late in agricultural works might run counter to such a view, while evidence of the viability of such welding between two separate plants, on the contrary, supports the thesis that this is

⁸²⁴ Tan Bi'an (1956, p. 421).

where the grafting of plants originated.⁸²⁵ But in any case, we should note that from a lexicographical point of view, there is no connection between the term *lian li* and the various names used in texts to designate ‘grafting’; similarly, the term for grafting by proximity or bringing two plants together is *tie* 貼, ‘to glue together’, which does not relate at all to the vocabulary linked with the grafting of plants.

It is in the *Er ya* that we find the most ancient term for the action of grafting, *jie* 接. Notes 269, 270 and 271 in the second part of Emil Bretschneider’s *Botanicon Sinicum* run as follows:

269 休無實李 *xiu; wu shi li* (a plum tree which brings no fruit)/Guo Pu: – Another name is 趙李 *zhao li*.

270 座接盧李 *cuo; jie lu li*/Guo Pu: – It is now called 麥李 *mai li* (wheat plum).

271 駁赤李 *bo; chi li* (red plum)/Guo Pu: – A plum of red colour.⁸²⁶

Neither Guo Pu’s commentary nor the English translation account for all the characters of the original text but they have been interpreted as constituting a unique statement describing the procedure of grafting. On the basis of the commentary on this passage in the *Er ya yi shu* 爾雅義疏 (Commentary on the *Er ya*) by Hao Yixing 郝懿行 (1755–1823), and also his own philological reflections,⁸²⁷ Wu Xiaohang reckons that ‘this passage describes the particular variations of fruits that are descended from two parents as a result of a graft between two varieties of plum tree’, and he interprets this as follows:

In villa gardens,⁸²⁸ one uses plum trees (*zhao* or *xu*) with dark green stoneless fruits as stock, the scions, from plum trees (*mai*), have fruits that resemble barley grain (*mai*),⁸²⁹ striped black and purple when they form but sweet and red (*chi*) when ripe; the hybrid is the red plum tree (*chi*) with small striped fruit.⁸³⁰

Without subscribing to the author’s Mitchourian view, I think, if his interpretation of the text is correct, that in this passage the *Er ya* is describing the appearance, following a graft, of a chimaera that produces the illusion of a new hybrid variety.

The *Er ya* also contains indirect references that may imply grafting techniques or at least the propagation of plants by means of cuttings. The different varieties of jujube tree mentioned in this text could not have been maintained and propagated by sowing seeds.⁸³¹ Even more clearly, the variety ‘without fruit’ (*wu shi*) – a description that I interpret as ‘with no fertile stone’ – might well result from a form of double grafting.⁸³² Another indirect piece of evidence is provided by two

⁸²⁵ That is the choice of a number of authors, such as Cheng Chenggui (1954). Tan Bi’an (1956) and also Zhou Zhaoji (1994).

⁸²⁶ Bretschneider (1893) Volume 2, pp. 117–18. ⁸²⁷ Hao Yixing (1983, pp. 1089–90).

⁸²⁸ The Chinese term *yuan lin* designates enclosed spaces of various dimensions that contain both plantations and constructions; hence my choice of this composite term rather than simply ‘garden’.

⁸²⁹ *Mai* is a generic term that designates a number of different cereals; wheat can also be translated as *xiao mai*, while barley is named *da mai*.

⁸³⁰ Wu Xiaohang (1985, 16).

⁸³¹ See above, p. 52.

⁸³² Such a phenomenon is noted in later texts.

citations, already noted by many authors, including Joseph Needham,⁸³³ from the *Zhou li* (2nd century BC) and the *Huai nan zi* (-139). Both refer to the transformation of a tangerine tree (*ju*)⁸³⁴ into a *Poncirus* (hardy orange tree) (*zhi*)⁸³⁵ when the former crossed the river Huai, in other words was transplanted to the north. Given that the latter, which is very resistant to the cold, served⁸³⁶ and continues to serve as stock⁸³⁷ for the most fragile citrus trees, the most plausible explanation for this change is the withering of a sweet orange tree grafted on to a *Poncirus* after being transplanted to an area where conditions were harsher. In this way, only the stock survived and continued to grow; it is a phenomenon that has often been noticed in arboriculture. Another example is provided by a passage from the *Lie zi* cited in the *Qi min yao shu*⁸³⁸ in connection with a grapefruit tree (*you* 柚),⁸³⁹ which also reports that when the tree crossed the Huai and arrived in the north, it was transformed into a *Poncirus*. In view of these various examples, I believe that they testify to the practice of grafting on fruit trees ever since a period at least earlier than that of the compilation of the *Er ya*, which is estimated to have been the 3rd century BC.⁸⁴⁰

The first precise description of a case of grafting is provided by Fan Shengzhi 汜勝之, a eunuch in the service of Cheng Di, the emperor of the Western Han, who reigned from -32 to -7. The text of the agricultural treatise produced by this author has been partially reconstructed from numerous later citations from it,⁸⁴¹ and the author of this restoration, Shi Shenghan, has also produced a bilingual (Chinese-English) edition of the text.⁸⁴² Here is the advice that is to be found on the cultivation, in shallow pits, of large marrows and gourds (*hu*⁸⁴³ 瓠):

Shallow-pit cultivation of gourds: collect seeds from big gourds. Seeds from a gourd a bushel (*dou*) in size let you harvest fruits one picul (*shi*)⁸⁴⁴ big and fruits ten piculs big can be obtained from seeds of a gourd one picul in size. Dig the ground to form a pit three feet (*chi*)⁸⁴⁵ across and deep. Mix the loose earth there in with an equal amount of bombyxine excrement, put the mixture into the pit, tramp down firm. Water, when all the water has seeped away, place ten gourds seeds upon [the wet soil] and cover with some more mixture of earth and bombyxine excrement. After the vines have grown to two feet or more, bind with cloth the ten vines together in each pit into one for a length of five inches (*cun*) and seal it with some mud. A few days later, the bound segments of the ten vines will fuse into one. Pinch off the nine thinner stems out of the ten, and leave the thickest to grow. When the chosen vine grows further and begins to set fruits, all the side branches not yet bearing fruits must be pinched off, so as to stop their overgrowth. To keep fruits: the first two or three

⁸³³ Cheng Chenggui (1954, 6), Zhou Zhaoji (1994, 13, 3, 267-8); *SCC* Volume 6, Part 1, pp. 103-5: 'When the orange tree crosses the Huai River it turns into the thorny limebush'. *Juyu huai er bei wei zhi* 橘踰淮而北為枳, in *Zhou li*, Chapter 11, 3a; *gu ju shu zhi jiang bei ze hua wei zhi* 故橘樹之江北則化而為枳, in *Huai nan zi*, Chapter 1, 6b.

⁸³⁴ *Citrus tangerina* Hort ex Tanaka.

⁸³⁵ *Poncirus trifoliata* Raf. (Jia Zuzhang and Jia Zushan 1955, Fig. 0918, p. 544).

⁸³⁶ As we shall soon see noted in the *Zhong shu shu*; see p. 526. ⁸³⁷ See, for example, Kong Xu (1987, p. 871).

⁸³⁸ Cf Mou Qiyu (1982, p. 583). ⁸³⁹ *Citrus maxima* (Burman) Merrill (= *Citrus grandis* (L.) Osb.).

⁸⁴⁰ Coblin (1993, 96). ⁸⁴¹ Shi Shenghan (1956). ⁸⁴² Shih Shêng-Han (1982).

⁸⁴³ *Lagenaria vulgaris* Seringe (long shape). I have used the translation by Shih Shêng-han (1982, pp. 39-41), with slight modifications.

⁸⁴⁴ One bushel, *dou* 斗, is the equivalent of 10.07 litres; one *shi* or *dan* 石 is thus roughly one hectolitre.

⁸⁴⁵ One foot is 0.305 metre.

fruits are not good enough, suppress them. Keep only the fourth, fifth and sixth. Just keep three fruits for each pit. When too dry, it is necessary to water. Make a small ditch around the pit about four or five inches deep, lead in water to stand there so as to moisten them from a distance. Never apply water directly into the pit.

The process of the multiplication of the volume of the fruits is certainly a graft even if it is not named as such. The idea is nevertheless clear: by fusing together a certain number of stems, the size of the fruits that the resulting stem bears will be multiplied by that number. The advantage of obtaining such a crop is clear, when one remembers the economic importance of gourds, given the many different uses of them.⁸⁴⁶

A second attestation of what can only be a grafting is provided by the *Shuo wen jie zi*. The entry *jie* 接 is here defined as ‘the joining of trees’, *xu mu ye* 續木也.⁸⁴⁷ Duan Yucai (1735–1815), in a commentary, explains it as follows: ‘These days, those who cultivate flowers or fruits, if they take a particular branch and graft it onto a particular tree, the flowers and fruits are similar to those of that tree’,⁸⁴⁸ which shows that he is certainly referring to the action of grafting. If we take into consideration the fact that the entries in the dictionary testify to a state of the language in a period more than three centuries earlier than the period when the work was compiled,⁸⁴⁹ this corroborates the information that the *Er ya* provides relating to varieties of jujube tree and validates the hypothesis of grafts of orange trees on to *Poncirus* trees, as well as Wu Xiaohang’s interpretation of the passage from the *Er ya* cited above, in which the term *jie* appears for the first time.⁸⁵⁰ The etymology of this term, like the analysis by Zhang Zongzi,⁸⁵¹ is particularly interesting in that it implicitly compares the action of grafting to the union of a man with a second wife (*jie* 妾), since the graph of the character *jie* 接 associates this element with the wood/tree radical, *mu* 木. I agree with this interpretation, for the semantic association of the graft with a marriage is made explicit a little later, as we shall soon see again.

Up until the 6th century, there are relatively few references to grafting. I have noted three that are recorded by Zhang Zongzi.⁸⁵² The first is to be found in *Ode to the Plum Tree*, *Li fu* 李賦, by Fu Xuan 傅玄 (217–78), which mentions a tree bearing fruits of three colours, each with a different colour and a different name.⁸⁵³ The second is in the *Bao pu zi* by Ge Hong (284–364); a metaphor declares that ‘one cuts a root to join it with a branch (*xu zhi* 續枝)’, a procedure that is later mentioned as being designed to regenerate old trees, in particular mulberry trees.⁸⁵⁴ *Offering to a*

⁸⁴⁶ For a study of further variations of this method in the course of history, see Zhou Zhaoji (1996).

⁸⁴⁷ Ding Fubao (1928, p. 2584a). ⁸⁴⁸ Ding Fubao (1928, p. 2584b).

⁸⁴⁹ Completed in +100 by Xu Shen and presented to the throne in 121 by his son.

⁸⁵⁰ However, the other passages that this author interprets as descriptions of various graftings do not seem convincing to me. See Wu Xiaohang (1985).

⁸⁵¹ Zhang Zongzi (1988, p. 324).

⁸⁵² Zhang Zongzi (1988, p. 325).

⁸⁵³ Citation from the *Tai ping yu lan* (1960, 4289) in Zhang Zongzi (1988, p. 325). The next two references are also taken from this author.

⁸⁵⁴ See p. 516 below.

Pear Tree, *Feng li shi* 奉梨詩, a poem by Sou Xin 廔信 (502–57), provides the third example, which states that pears of the *han xiao* 含消 variety,⁸⁵⁵ after grafting (*jie zhi* 接枝), became more perfumed. Pears are also the subject of the first detailed description of a grafting of trees, which appears in the *Qi min yao shu* by Jia Sixie. Article 37 of Part 4 is entitled ‘Inserting Pear Trees’, ‘Cha li’ 插梨. Let us pause to consider that title. The term *cha*, the literal meaning of which is ‘to push into, to insert’, is used in this book with two meanings that are technically different but certainly show that, in the mind of the author, the two operations are similar: propagation by cuttings and ring grafting. In both cases, it is indeed a matter of inserting a young branch into, in the one case, the ground, in the other into the surface of a trunk of a tree that has been sawn. In Article 31, which relates to hedges, the term is used in the sense of ‘taking cuttings’ from willow trees which are then used to thicken growing hedges. Nor is this the only procedure for propagating plants mentioned by Jia Sixie, who advised practising layering, *ya zhi* 壓枝, when cultivating mulberry trees: since the growth of plants from seeds was very much slower, he advised resorting to seedlings only in the absence of trees already planted.⁸⁵⁶ But here is a translation of the procedure of the grafting (*cha fa* 插法) of pear trees:

Use [wild pear trees] *tang* 棠 and *du* 杜.⁸⁵⁷ (Note: with *tang*, the pears are larger and with delicate flesh; *du* is inferior; on mulberry trees the pears are very disappointing; whatever is grafted onto a jujube tree or a pomegranate tree produces better fruit but out of a harvest of ten only one or two are worth picking.) Wild stock (*du*) thicker than an arm can be used for grafting. (Note: stock should first be sown and grafted only after one year. If the host and the guest [the stock and the scion] are well suited, it is viable; but even then, if the stock dies, the graft will not live.) On trees, if they are big, one grafts five branches (*zhi* 枝), if they are small, two or three. The best period is when the leaves of the pear tree begin imperceptibly to move, the least good time is when the buds are opening. First, take a hemp rope and wind it ten times [around the trunk]; with a saw, saw the wild stock five or six inches above the ground. (Note: if you do not bind with a rope, you risk spoiling the skin (*pi* 皮) while sawing. If you leave the wild stock high, the grafted scions of the pear tree will be luxuriant and will be broken in a strong wind . . .) Obliquely cut a piece of bamboo, to make a wedge; stick it in between the skin and the wood, about one inch deep. Cut a branch of a good pear tree chosen from among those exposed to the south. (Note: those facing north give few fruits.) It should be five or six inches long; cut it obliquely to match the dimensions of the bamboo wedge; using a knife, make an incision just above the bevelled slit; remove the black skin. (Note: do not harm the dark green skin, if you do, the scion will die.) Take out the bamboo wedge, insert the scion as far as the peeled part, with the edge of the wood

⁸⁵⁵ A famous variety of very large pear which disintegrate into liquid when they fall to the ground. To avoid losing them when they were ripe, they were wrapped in a cloth sack, according to Luo Zhufeng (1986–94, Volume 3, p. 228). We should note that Chinese pears are of the ‘Nashi’ type; that is to say, they are fragrant, sweet and very juicy, with flesh that is crisp but not melting, whereas it is precisely the melting quality, known as ‘buttery’, that was generally preferred by Western taste from the 19th century onward.

⁸⁵⁶ Shi Shenghan (1957, p. 282: 45.2.3); Mou Qiyu (1982, p. 230).

⁸⁵⁷ *Tang*: *Pyrus phaeocarpa* Rehd., *Du*: *P. betulafolia* Bge. According to Mou Qiyu (1982, p. 208). In the rest of the passage only this species is named as the stock, which is why I have translated it as ‘wild stock’.

against the wood, the corona of skin close to the skin. When it is well fixed, wrap a piece of silk around the top of the wild stock and seal it over with some mud, cover with earth so that only the grafted scion from the pear tree emerges, the earth being stacked like a pyramid. Water the pear tree, when the water is totally absorbed by the earth, do not let the latter dry out and become hard. Out of one hundred, you will not lose a single one. (Note: the scions for grafting from the pear tree are very fragile; when you pile the earth up round them take care not to wound them, for that might break them.) If you cut the wild stock in a cross, out of ten, you will not be successful with a single one. (Note: naturally enough, for if the wood is broken, the bark opens up and through that space the wood dries up.) When the grafted pear scion has taken, if leaves appear from the sides of the wild stock, eliminate them. (Note: if you do not do this, the potential force (*shi* 勢)⁸⁵⁸ is divided and the growth of the pear tree slows down.) When you graft pear trees, in an orchard, [graft] lateral branches; in a courtyard, graft branches from the middle of the tree. (Note: lateral branches make it easier to pick the fruit under the tree; branches from the middle grow straight upward and do not get in the way.) The little branches that take close to the base make pretty trees but will produce fruit only after five years; older branches that are divided produce fruit in three years but the trees are ungainly.⁸⁵⁹

To transport scions to be grafted over long distances, the author advises burning up to three or four inches of the bottom part.

Reading this passage, one recognises a corona or ring grafting, a technique still practised in orchards today. The term *jie* is at no point used and a specific terminology for the various elements involved does not yet exist; only once, in a note, is the stock called ‘the host’ (*zhu* 主) and the scion ‘the guest’ (*ke* 客). Otherwise, the stock, which I have translated as ‘wild stock’, is designated by the name of the wild species (*du*), which in this text seems to have a generic sense, while the scion is called either ‘cultivated pear tree’ (*li* 梨) or ‘branch’ (*zhi* 枝). The bark is called, quite simply, ‘skin’ (*pi*). However, one does notice the importance ascribed to certain parts of the bark that are considered, quite rightly, potentially vital for the scion, and also for effecting a careful match of parts that are equivalent, the wood and the ‘skin’ of the stock and the scion, in order to ensure the success of the operation.

In Article 40, devoted to the cultivation of kakis, the author mentions the possibility of grafting them in the same manner as pear trees, using *ruan zao* 榿棗, *Diospyros lotus* L., as stock.

The following treatise, *Sì shí zuān yào* 四時纂要⁸⁶⁰ (Important Rules for the Four Seasons) by Han E 韓鄂 (early 10th century?), which draws heavily on the *Qí mǐn yào shu*, devotes a rubric to the grafting of trees among the activities of the first month of the agricultural calendar and also describes how to cultivate large gourds,

⁸⁵⁸ On the notion of *shi*, see Jullien (1992).

⁸⁵⁹ English version of author’s French translation. Shi Shenghan (1957, pp. 252–7), Shih Shêng-han (1982, pp. 57–9), Mou Qiuyu (1982, pp. 203–9).

⁸⁶⁰ We should remember that this text, edited by Mou Qiuyu (1981b), is based on the only known ancient copy of this treatise, which was rediscovered in Japan in 1960. It is a Korean edition dated 1590, and it raises a number of problems that are noted by Wang Yuhu (1979, pp. 48–50) and are fully taken into consideration by the modern scientific editor, who in his preface also tries to identify the author. See Mou Qiuyu (1981, pp. 1–12).

recommending the following method, which is rather different to the one described above.⁸⁶¹

At the beginning of the second month, dig the ground to make a square ditch with sides four or five feet in length and as deep. Fill with sesame, mungo stems and rotted grass, alternating one layer of plants and one layer of manure, four or five times; add a last layer of manure one foot deep, and sow ten seeds. Wait until these grow, choose the four best stems to stick them together in pairs; remove half the skin of the zone of contact with a bamboo knife, push them together, bind firmly with hemp and seal with clay, as in the grafting of trees. Wait until they fuse together, then remove one stem from each pair; take the two remaining stems, weld them together and repeat the same process as before. What will remain will be one single stem, for the four now form a single stock. When there are fruits, keep the two largest and eat the remainder as suits you. In this way, varieties with one bushel of fruit can be transformed to produce ten bushels.

This new method reveals the results of the experience acquired since the purely arithmetical procedure of Fan Shengzi. Even if ten seeds are sown in the seed holes, that is simply to make it possible to select only the four finest plants, which, after grafting into pairs, will be submitted to a further selection to end up with a single stem resulting from two successive grafts by proximity. As far as I know, this is the first mention of a practice of double grafting for herbaceous plants in China.

This text presents interesting developments in the treatment of trees, compared to what we read in the *Qi min yao shu*. The author uses the term *jie* 接 for ‘grafting’. For stock he recommends choosing stumps that are the ‘bases of trees’ (*shu ben* 樹本), of a size between that of an axe handle and that of an arm. He calls these ‘the anvils of trees’ (*shu zhen* 樹砧). Here is the full text of the rubric.⁸⁶²

If the anvils are large, they must be sawn one foot from the ground; lower down the force of the ground is too strong and restrains the tree that one is grafting. If they are small, one saws them seven to eight inches from the ground; if a small anvil is cut too high, the *qi* of the earth has difficulty in responding. It is best to use a saw with small teeth as large teeth would spoil the ‘skin of the anvil’ (*zhen pi* 砧皮). Take a sharp knife and make two slits on opposite sides of the edge of the anvil, each one an inch long, and graft two branches onto each anvil. When they have taken well – that is to say, when leaves are growing – remove the weaker of the two. As for the tree that one is grafting, choose slender young branches (*xi nen zhi* 細嫩枝) that face south, as thick as a sinew and four to five inches long; branches that face north produce few fruits. You can only graft branches that are two years old, with two knots. When grafting, take care to identify the end that goes into the anvil, then insert it into the slits on the edge of the anvil, to a depth of half an inch. Once inserted on both sides, the zones of skin of the grafted branches and those of the anvil should meet perfectly without being too loose or too firm. If too loose, the male *qi* (*yang qi* 陽氣) will not respond, if too firm, the excessive force stifles. Everything depends on the delicate touch of your fingers. Once the branches are inserted, take a piece of bark (*shu pi* 樹皮) of the same colour, half an inch wide, and place this over the wounds on the side of the anvil, to prevent the rain from

⁸⁶¹ Mou Qiyu (1981b, 69, para. 65).

⁸⁶² Mou Qiyu (1981b, pp. 22–3), English version of the author’s French translation.

entering. After this operation, seal the surface of the anvil and the tips of the scions (*zhi tou* 枝頭) with mud. Now wrap around a piece of paper tied with hemp in order to prevent the mud from slipping off. If leaves appear on the anvil, strip them off immediately. Next, spread ash and manure at the foot of the anvil. Furthermore, protect it with thorny bushes to prevent animals from shifting the bases of the grafted scions. With the beneficent aid of the spring rains, the scions will take easily. If the grafts of plants with seeds within their fruit belong to corresponding categories, all the grafts will be successful, such as apple trees⁸⁶³ or pear trees⁸⁶⁴ onto flowering quince trees⁸⁶⁵ or chestnut trees⁸⁶⁶ onto oak trees⁸⁶⁷.

What we can recognise here is again a corona or ring grafting, but one that is slightly different. Whereas in the *Qi min yao shu* the insertion of the scions was effected by forcing them in between the wood and its bark, without slitting the latter, experience acquired through practice has shown that the bark can be opened without deterring acceptance of the graft. Also noticeable is a degree of specialisation in the vocabulary used. The author distinguishes between *jie* 接, the general term for 'grafting', and *cha* 插, which is reserved for the insertion of a scion into the stock. The stock is called *shu zhen* 樹砧, 'the anvil of the tree', or simply *zhen*, 'anvil'. The scion is called *zhi* 枝, 'branch', and *zhi tou* 枝頭 seems to designate its slender extremity. Bark is generally called *pi* 皮, 'skin', but there is one occurrence of *shu pi*, 'tree-skin', a term that is standard today. The author also sets out a first theoretical suggestion – one that is implicit in the *Qi min yao shu* – concerning the choice of a stock that suits the particular scion to be grafted: the two should belong to corresponding categories of things. This mention of the compatibility of things belonging to corresponding categories, *wu lei xiang gan* 物類相感, is a reminder of the fact that 'the affinities or analogies that it is possible to discern between certain categories lie at the heart of the resonance [*gan ying* 感應, literally 'stimulate and respond to stimulation'] through which, according to correlative cosmology, all natural phenomena are explained'.⁸⁶⁸ Already in the *Er ya*, it was on the basis of a similarity between their fruit stones that peach trees and plum trees were placed in the same category.⁸⁶⁹

Soon after the passage on the grafting of trees,⁸⁷⁰ Han E tackles the cultivation of mulberry trees, where he recommends sowing the seed of mulberry trees from Lu, which are black mulberry trees, but in the case of white mulberry trees with no fruit, the technique to adopt is layering (*ya tiao* 壓條) in order to produce new plants, although the sowing of seed is not excluded provided it is possible to obtain the seeds. This comment suggests that black mulberry trees must have been mainly monoecious while white mulberry trees were more generally dioecious.

⁸⁶³ *Lin qin* 林檎, *Malus asiatica* Nakai. In anon. (1977, no 2535, p. 1246), Yu Dejun (1982, p. 100).

⁸⁶⁴ *Li* 梨, *Pyrus* sp. ⁸⁶⁵ *Mu gua* 木瓜, *Chaenomeles lagenaria* (Loisel) Koidz. in anon. (1977, no 700, p. 349).

⁸⁶⁶ *Li* 栗, *Castanea mollissima* Bl.; in anon. (1977, no 3731, p. 1819).

⁸⁶⁷ *Li* 櫟 today designates *Quercus acutissima* Carr.; in anon. (1977b, Fig. 5433). But here this term probably has a generic sense.

⁸⁶⁸ Cheng (1997, p. 283).

⁸⁶⁹ See p. 53 above.

⁸⁷⁰ Mou Qiyu (1981b, p. 23, §53).

Even though, for fruit trees, a grafting technique is by this time well attested and principles for the selection of scions and stock are well established, it is nevertheless noticeable that the number of texts that refer to them remains very small. To my mind, this does not mean that the practice was rare but rather that it was the concern of a category of the population that was certainly illiterate and had no means or no wish to transmit its knowledge in writing, since experience was all that was needed. Evidence for this is provided by the social phenomenon that started to develop at the beginning of the Song dynasty. From being a technique used to increase the products chiefly of agriculturalists, grafting now was about to find itself at the heart of the aesthetic interests of the top echelons of society. An unprecedented delight in flowers was now evident, in particular those of the shrub peony (*mu dan* 牡丹),⁸⁷¹ closely followed by chrysanthemums and another peony, *shao yao* 芍藥, the herbaceous peony.⁸⁷² At the same time, in order to respond to an extremely lucrative market demand, horticulturists began actually to specialise in profitable grafting techniques. The first volume devoted to botany noted a number of examples where astonishing plants were produced.⁸⁷³ Some of these may initially have resulted from chance but they also revealed the talent of cultivators spurred on by the passion of a public, the richest members of which were prepared to pay considerable sums in order to buy a grafting scion or even sometimes just to see a remarkable bloom. It is, at any rate, significant that, from this period onward, mentions and descriptions of grafting appear regularly in works composed by literati who are passionate about rare plants – either monographs or general texts, as we shall see. First, though, I would like to present a translation of a veritable apology for grafting, expressed in the form of a poem by an eminent scholar, Chen Guan 陳瓘, personal name Yingzhong 瑩中 (1059–1124). It is entitled simply ‘Jie hua’ 接花, ‘Grafting Flowers’:⁸⁷⁴

From the colour red, to be able to make purple.
 From a single flower, to be able to make a double,
 From a small flower, to be able to make a big one,
 From what has poor fertility, to be able to produce great fertility.
 Heaven grants according to well-defined dispositions.
 I have the power to transgress this.
 I declare that the hand that grafts
 Can seize the power of creation.
 People who learn of this are most surprised,
 And delight me with their incessant dubious sighs:
 ‘Can intelligence thus produce marvels?
 Can one really change the course of things?’
 I want to gather chrysanthemums in springtime,
 I want to admire peach blossom in winter,

⁸⁷¹ *P. suffruticosa* Andr. = *P. moutan* Sims. ⁸⁷² *P. albiflora* Pall. ⁸⁷³ Cf SCC Volume 6, Part 1, pp. 394–409.

⁸⁷⁴ Cited in Tan Bi'an (1956, p. 427) and *Tu shu ji cheng*, Cao Mu Dian, section 12. English version of author's French translation.

You who cannot cultivate by grafting,
 Your talent is solely the fruit of labour.
 Grass lives on rain and dew,
 This life depends on the seasons.
 The pine survives the frost and snow;
 That survival is in its very nature.
 You, with the changes that you provoke,
 Simply follow the course of time.
 But the seasons, can you really forget them?
 When can you decide not to follow them?

As we shall see, this frame of mind must have been shared by other eminent literati who, even if they did not themselves practise grafting, were certainly excellent observers of the process.

In his famous *Luoyang mu dan ji* 洛陽牡丹記 (Notes on the Shrub Peonies of Luoyang) (1034), Ouyang Xiu 歐陽修 provides interesting information about the cultivation of peonies. He writes as follows:

In early spring, the people of Luoyang go into the Tao An Mountains and take little cuttings (*xiao zai zi* 小栽子), which they then sell in town. These are known as 'leafy mountain stems' (*shan bi zi* 山鬍子). They are planted in well-prepared soil and in the autumn they are grafted. There is someone very famous called Men Yuanzi, whom all the great families employ . . . The time to graft is between the Festival of the God of the soil (*she* 社) (the last fortnight of the eighth month) and *Zhong yang* 重陽 (the ninth of the ninth month). You cut the flower stem about five to seven inches from the ground and then you graft. Coat it in mud that you surround with soft earth. Cover with a little shelter made from reeds in order to protect it from the wind and the sun. Leave no more than a small opening on the southern side, to let the air in. In the spring, remove this protection. That is the method of grafting.

Wang Yuhu notes the existence, up until the end of the Ming period (1644), of a *Luoyang hua pu* 洛陽花譜⁸⁷⁵ (Treatise on the Peony Shrubs of Luoyang), which may also have been published under the titles *Hua pu* 花譜 (Treatise on Flowers [shrub peonies]) and *Qing li hua pu* 慶曆花譜 (Treatise on the Peonies of the Qing Li Period).⁸⁷⁶ Its author, Zhang Xun 張岫, *zi* Zijian 子堅, whose younger brother Zhang Min 張岷 was a disciple of Shao Yong 邵雍 (1011–77), thus lived under the first Song dynasty and, if the synonyms of the titles are correct, must have composed the treatise between 1041 and 1048. The text was divided into six principal parts, which respectively listed fifty-eight varieties of shrub peony (*mu dan*) with double flowers, and sixty-two semi-double flowers coloured yellow, red, purple and white, followed by a chapter devoted to herbaceous peonies (*shao yao*).⁸⁷⁷

In the *Mu dan rong ru zhi* 牡丹榮辱志 (1050), Qiu Xuan 邱璿 mentions grafting in passing.⁸⁷⁸ A few years later, Wang Guan 王觀, in the *Treatise on the Herbaceous Peonies of Yangzhou*, *Yangzhou shao yao pu* 揚州芍藥譜 (1075), does not mention grafting

⁸⁷⁵ Wang Yuhu (1979, pp. 68–9).

⁸⁷⁶ In anon. (1993a, p. 53).

⁸⁷⁷ Wang Yuhu (1979, p. 58).

⁸⁷⁸ *Tu shu ji cheng*, Cao Mu Dian, *juan* 287, 54b.

but does emphasise the need for vegetative propagation by dividing the roots every two or three years. Otherwise, he warns, as they grow old they harden, and since there are no new buds, there are no more flowers.

The text that is the most rich in advice is certainly the part devoted to shrub peonies in the treatise by Zhou Shihou 周師厚⁸⁷⁹ entitled *Luoyang hua mu ji* 洛陽花木記 (Notes on the Trees and Flowers of Luoyang) (1082). (In the previous chapter we noted the excellent quality of its information on the plants cultivated in Luoyang.)⁸⁸⁰ The part of the text entitled 'Xu mu dan' 敘牡丹⁸⁸¹ (Notes on Shrub Peonies) provides many details about the forty-three varieties of peony that are cited. For example, on the most famous of them, 'the Yellow of Yao' (*Yao huang* 姚黃), we learn that even though the Yao family grafts many peonies in Luoyang itself, it is only on their original property to the north of the river Luo that this variety flowers, with blooms that are sometimes double, sometimes single, sometimes half-double (*duo ye* 多葉).⁸⁸² However, the text goes on to say, there are never more than three flowers each year. The interest of the practice, described by Ouyang Xiu, of planting cuttings of wild plants that serve as stock is demonstrated by the existence of another yellow peony, *Yu pao huang* 御袍黃, 'Yellow Imperial Tunic', which is the product of a mutation⁸⁸³ in the middle of a plantation of several hundreds of cuttings, those 'wild leafy stems' (*shan bi zi* 山篋子), in an imperial garden.⁸⁸⁴ Zhou Shihou also draws attention to a double peony with red flowers (*xi zhuang hong* 洗妝紅) that likewise appeared as a result of a mutation,⁸⁸⁵ again among the 'wild leafy stems' of the Jin li Garden (金李圃).⁸⁸⁶ In that same garden a peony coloured two different shades of red (*er se hong* 二色紅) appeared on a grafted scion: at each fork flowers appeared, some of them dark red, some light red. A double variety with purple flowers (*zuo zi* 左紫) appeared in the garden of a certain Zuo and was then multiplied by grafting. However, in most cases, the author notes, there is no increase in the number of petals, except in one temple.⁸⁸⁷ It would be easy to provide more examples that testify to an extremely detailed approach to the distinction of varieties. The author is not content simply to describe them, systematically indicating the colour of the petals and how abundant they are; he also explains how they were obtained and the details of their transmission. It is remarkable how often it is noted that a plant has been obtained in a spontaneous fashion, resulting from mutations in the plantations of large numbers of cuttings taken from wild and grafted plants. Following his review of forms of shrub peony that are particularly valued among the 109 that are simply cited in the first part of his account, the author moves on to consider cultivation methods in general. The chapter 'Si shi bian jie fa' 四時變接法 (Methods of Transformative Grafting in the Course of the Four Seasons) deserves our full attention. That title is followed by

⁸⁷⁹ In the *Shuo fu*, *juan* 26, the text appears under the name of Zhou Xu 周敘.

⁸⁸⁰ See pp. 454–8 above.

⁸⁸¹ Pp. 19–27 in *Shuo fu*.

⁸⁸² Pp. 19b in *Shuo fu*.

⁸⁸³ The author writes, 'One of these plants suddenly (*hu* 忽) changed (*bian* 變) into this kind.'

⁸⁸⁴ *Shuo fu*, p. 20b.

⁸⁸⁵ 'Suddenly appeared', *hu sheng* 忽生.

⁸⁸⁶ *Shuo fu*, p. 22b.

⁸⁸⁷ *Shuo fu*, p. 23b.

a note that is also a warning to gardeners: it explains that it is 'only the climate of Luoyang that is suitable for these transformative grafts and elsewhere it is necessary to graft in accordance with the local *qi*'. This remark confirms the importance of the cosmological view: it is necessary that the plants, here in the form of cuttings or scions for grafting, should *respond* to the nature of the *qi* of the place where they are to develop. I shall now continue with a translation of large extracts from this very instructive text:

Around Li Chun [c.4 February] (Arrival of Spring), one grafts all thorny plants.

After Yu Shui [c.20 February] (Rain), graft as follows:

- on a flowering quince (*mu gua* 木瓜),⁸⁸⁸ four kinds of *mu gua*;
- on a cherry tree (*ying tao* 櫻桃), all the *tao*,⁸⁸⁹ and also *ban zhi hong* 半枝紅,⁸⁹⁰
- on a magnolia (*mu bi* 木筆),⁸⁹¹ magnolias (*mu lan* 木蘭⁸⁹² and *xin yi* 辛夷);⁸⁹³
- on a wild rose (*ye qiang wei* 野薔薇), a yellow rose with double flowers (*qian ye huang qiang wei* 千葉黃薔薇) and all thorny plants (*ci hua* 刺花);
- on a quince (*wen bo* 榲桲),⁸⁹⁴ the Chinese flowering quince (*ming zha* 檠楂);⁸⁹⁵
- on a Chinese hawthorn (*zha zi* 楂子),⁸⁹⁶ the quince (*wen bo* 榲桲).

For the periods of the second month:

- on an ungrafted common apple tree (*nai bei* 奈棹),⁸⁹⁷ *lin qin* apple trees 林檎⁸⁹⁸ and Chinese flowering apple trees (*hai tang* 海棠),⁸⁹⁹
- on an ungrafted peach tree (*tao bei* 桃棹),⁹⁰⁰ all the *tao* 桃 and all the Japanese apricot trees (*mei* 梅);⁹⁰¹
- on an ungrafted apricot tree (*xing bei* 杏棹),⁹⁰² all the apricot trees (*xing*) and the plum trees (*li zi* 李子);⁹⁰³
- on a pear tree (*tang li* 棠梨),⁹⁰⁴ all the pear trees (*li* 梨)⁹⁰⁵ and the flowering Chinese apple trees (*hai tang*).

For Chun Fen [c.20 March] (Spring Equinox):

Layer the junipers and cypresses (*gui bai* 檜柏); divide the lilies (*bai he* 百合); graft the Japanese rose bushes (*mei gui* 玫瑰),⁹⁰⁶ divide the plantain lilies (*yu zan* 玉簪),⁹⁰⁷ propagate the hibiscus (*fu rong* 芙蓉) by cuttings;⁹⁰⁸ divide the 'azure reeds' (? *bi lu* 碧蘆) and the

⁸⁸⁸ *Chaenomeles lagenaria* Koidz. = *Cydonia lagenaria* Lois.

⁸⁸⁹ This piece of information stresses the determining role played by a name in characterising the nature of plants. See the case of the almond tree in Li Shizhen, pp. 87–9.

⁸⁹⁰ Not identified. ⁸⁹¹ *Magnolia liliflora* Desr. var. ⁸⁹² *Magnolia denudata* Desr.

⁸⁹³ *Magnolia liliflora* Desr. var. ⁸⁹⁴ *Cydonia oblonga* Mill. (anon. 1977, no 5072, p. 2431).

⁸⁹⁵ *Chaenomeles sinensis* Khoene = *Cydonia sinensis* Thouin. ⁸⁹⁶ *Crataegus pinnatifida* Bge.

⁸⁹⁷ *Bei* in its first sense designates a spontaneous species of persimmon. In the context of this passage, I interpret this as the author's decision to emphasise the fact that grafting stock consists of spontaneous wild trees or plants, whereas the scions come from cultivated varieties of the trees. *Nai*: *Malus pumila* Mill. (Yu Dejun 1982, p. 98).

⁸⁹⁸ *Malus asiatica* Nakai (Yu Dejun 1982, p. 100). ⁸⁹⁹ *Malus spectabilis* (Ait.) Borkh. (Yu Dejun 1982, p. 102).

⁹⁰⁰ *Prunus persica* (L.) Batsch. = *Amygdalus persica* L. (Yu Dejun 1982, p. 28).

⁹⁰¹ *Prunus mume* Sieb. et Zucc. = *Armeniaca mume* Sieb. (Yu Dejun 1982, p. 51).

⁹⁰² *Prunus armeniaca* L. = *Armeniaca vulgaris* Lam. (Yu Dejun 1982, p. 45).

⁹⁰³ *Prunus salicina* Lindl. (Yu Dejun 1982, p. 55). ⁹⁰⁴ *Pyrus betulafolia* Bunge (Yu Dejun 1982, p. 139).

⁹⁰⁵ *Pyrus sp.* ⁹⁰⁶ *Rosa rugosa* Thunb. ⁹⁰⁷ *Hosta sieboldiana* Engl. ⁹⁰⁸ *Hibiscus mutabilis* L.

banana trees (*ba jiao* 芭蕉);⁹⁰⁹ water the lilies (*bai he*); cut the 'golden carnations' (? *jin shi zhu* 金石竹); sow the inulas (*jin qian zi* 金錢子);⁹¹⁰ plant the lilies (*shan dan* 山丹);⁹¹¹ divide the early lotus plants (*zao lian* 早蓮); graft all the pomegranate trees onto other pomegranate trees; graft onto the persimmon (*ruan zao* 軟棗)⁹¹² all the kakis (*shi* 柿);⁹¹³ graft all jujube trees onto an ungrafted jujube tree (*zao bei* 棗桺);⁹¹⁴ propagate by cuttings Japanese rose bushes with purple branches (*zi tiao qiang wei* 紫條薔薇). Third month, first ten days: sow flower seeds, propagate flowers by cuttings.

Third month, for Gu Yu [c.20 April] (Rain for cereals):

Divide the chrysanthemums; sow the cockscombs (*ji guan* 雞冠);⁹¹⁵ propagate by cuttings the polychrome amaranthus plants (*wu se xian* 五色莧)⁹¹⁶ and also the red ones (*hong xian* 紅莧).⁹¹⁷

Periods of the seventh month: for Chu Shu [c.23 August] (End of the Dog Days): sow the peonies (*shao yao*);⁹¹⁸ sow the shrub peonies (*mu dan*).

Periods of the eighth month: divide the shrub peonies; graft the 'leafy stems' of shrub peonies; divide the peonies (*shao yao*); propagate by cuttings all thorny plants . . .

After a detailed description of the horticultural activities throughout the year, the author tackles the various procedures used to obtain exceptional peonies, successively grafting, working the soil, sowing and nurturing new plants. I think it will now be useful to provide a translation of the four relevant paragraphs both because of their intrinsic interest and also in order to obtain a comparative perspective.

The Grafting of Flowers [peonies] (*jie hua fa* 接花法)⁹¹⁹

Grafting should take place after *Qiu she* 秋社⁹²⁰ and before the ninth month; no other time is suitable. Two or three years before grafting one sows the 'ancestors'. [For grafting], only those with sturdy roots are suitable. The fact is that the roots of 'ancestors' grown in seedbeds (*jia zu zi* 家祖子) are tender so their veins are crammed with juices and their wood is full. Wild ancestors (*shan zu zi* 山祖子) are much older, they have few roots and their wood is empty; accordingly, there are many losses if one attempts to graft. The scion must be trimmed regularly. As a general rule, the skin of the root must envelop it closely, leaving no empty space. If there is a space, the scions often drop out and the skin does not heal together; this causes the scion to dry up and die. The scion must be tightly bound in so that there is no draught and the rain does not wet the edge of the opening [on the stock]. The scion must be covered with fine soil. It must not be moved about. About one month after the grafting, one must examine it from time to time so as not to allow to form beneath the root adventitious buds [literally, 'roots that are jealous', *du ya* 妒芽] that divide as they grow, thereby diminishing the juices and weakening the scions. Always choose scions from branches of the tree that are tender and plump; the best ones are those that are full, round and smooth with large flourishing buds. Those that are empty and angular do not produce flowers.⁹²¹

⁹⁰⁹ *Musa basoo* Sieb.

⁹¹⁰ *Inula britannica* L. var. *chinensis* (Rupr.) Reg.

⁹¹¹ *Lilium concolor* Salisb.

⁹¹² *Diospyros lotus* L.

⁹¹³ *Diospyros kaki* L.

⁹¹⁴ *Zizyphus jujuba* Mill.

⁹¹⁵ *Celosia cristata* L.

⁹¹⁶ ? *Amarantus tricolor* L.

⁹¹⁷ *Amaranthus* sp.

⁹¹⁸ *Paeonia lactiflora* Pall.

⁹¹⁹ In *Shuo fu*, p. 25b.

⁹²⁰ The Festival of the God of the Soil 土神, which was usually held on the fifth day in 戊戌, after Li Qiu 立秋 (16 August).

⁹²¹ *Shuo fu*, p. 25b.

The Cultivation of Flowers (peonies)⁹²²

Whoever wishes to cultivate flowers [peonies] must attend to the soil in the fourth and fifth months. If the soil is not very rich, it must be turned over to a depth of two feet in order to remove stones and broken tiles, using a spade, then, with a hoe, keep removing the weeds up until the period in between the Festival of the God of the Soil and the ninth month. If the soil contains too much rubbish or is saline, it is necessary to dig down at least three feet, using a hoe, remove the soil and replace it with good new yellow earth taken from elsewhere. Above all do not add any manure, for it produces larvae and beetles that attack the roots of the flowers. If this happens, the scion becomes sickly and will not produce any double blooms. You must not dig too deep as, if you do, the roots cannot spread out and the flowers will not open fully. The right depth is when the tip of the scion is at the level of the top of the soil. When digging the holes, the depth must be calculated according to the length of the root. The hole must be wide and regular and the earth rich and fine. In the middle of the hole, little mounds of earth should be arranged, wide at the base and pointed at the top. Sit the flowers on the top of the mounds, then arrange the roots so that they spread out in all four directions. Then cover them over with yellow soil up to the place of the graft onto the stock (*chuang kou* 瘡口).

Sowing the 'Ancestors' [the stock that is to receive the graft]⁹²³

Whoever wishes to cultivate 'flowers' [peonies] must first, in the fifth or sixth month, prepare a bed of good earth in a shady spot . . . Each year, after the seventh month, once the double flowers have withered, you must collect the fruits (*hua ping* 花瓶) [literally 'the peony flakes'] when the seeds are starting to turn yellow. Break them open to remove the seeds, which are sown in the beds that have already been prepared, as one does with vegetables. One should not sow some seeds on one day and the rest on another for the seeds would dry up and turn black and if one sows blackened seeds, not one in ten thousand will grow! The seeds should be sown quite densely, for otherwise there will not be a good crop. The soil should not be tamped down. If it is dry, water it before sowing. Rake it, just as one does for vegetables. Water it once every ten days unless it is raining. During the winter months, cover with leaves from the trees. If it snows, cover the leaves with snow. Then the buds will appear. The bed must be weeded and, if there is no rain, it should be watered every ten days. Absolutely no manure should be added. Next, after the Festival of the God of the Soil, in the eighth month, rearrange the beds, by dividing up the plants and transplanting them, as one does with vegetables. If the fruits are already ripe and the soil has not yet been prepared, first gather the 'flakes' (*ping* 瓶) [fruits] with their seeds, dig a trench in the soil and stock them there. Once the soil has been rapidly prepared, the seeds can be sown. Take the seeds and proceed as before. Some of the plants will form double flowers.

Method for Thinning out the Flowers (*da bao hua fa* 打剝花法)⁹²⁴

For double peonies, it is necessary to thin out the flowers once before the Festival of the God of the Soil. Keep only four flowers per plant. Before grafting the scions onto the ancestors, all the rest on the stems can be eliminated. After the grafting, in the second month of the following year, look into the heart of the flowers among the petals of the remaining flower buds. Look carefully at the barbs [stamens]. If they are smooth, round and full, keep them and they will produce double flowers. If the heart of the flower (*hua rui* 花蕊)⁹²⁵ is empty, eliminate the barbs that will not produce double flowers. You may leave

⁹²² *Shuo fu*, p. 26a.

⁹²³ *Shuo fu*, p. 26a, b.

⁹²⁴ *Shuo fu*, pp. 26b–27a.

⁹²⁵ On the names of the different parts of the flower in Chinese, before modern botanical terminology, see Métaillé (1994).

no more than two or three hearts (*ruì*) per plant, for if the heads of the flowers (*hua tou* 花頭) are more numerous, there will be no double blooms and those that do flower will be small.

Such were the means adopted in order to encourage the arrival of novelties and possibly to produce double blooms.

Later on, Lu You 陸游, in his *Tianpeng mu dan pu* 天彭牡丹譜 (Treatise on the Tree Peonies of Tianpeng) (1178), mentions grafting as but one of the practices associated with ‘making peonies’ (*nong hua* 弄花), namely propagation by cuttings (*zai* 栽), grafting (*jie*), separation (*ti* 剔) and general care (*zhi* 治).⁹²⁶ Finally, Hu Yuanzhi 胡元質, in his *Mu dan pu* 牡丹譜 (Treatise on Shrub Peonies) (12th–13th century),⁹²⁷ notes that if one grafts single flowers onto plants with double flowers, they will become double.

Let us now consider the flower next most appreciated, after the peony, namely the chrysanthemum. The three earliest treatises on chrysanthemums, the *Liu shi ju pu* 劉氏菊譜 (1104) by Liu Meng 劉蒙, the *Shi shi ju pu* 史氏菊譜 (1175) by Shi Zhengzhi 史正志 and the *Fan cun ju pu* 范村菊譜 (1186) by Fan Chengda 范成大, make no mention of grafting techniques. However, in the *Bai ju ji pu* 百菊集譜 (Compendium of all Chrysanthemums) (1242),⁹²⁸ the author, Shi Zhu 史鑄, recommends, if there are no flowers in the year following the first blooming, grafting the flowers in the next year. He also suggests grafting by proximity in order to obtain two-toned blooms: ‘Take two chrysanthemum plants, one white, the other yellow, remove a sliver of skin from each and bind them together with a strip of hemp bark; when the flowers appear, they will be half-white and half-yellow’. We should note that in this type of grafting by proximity the aim is not to replace the blooms of the graft-receiver with those of a grafted slip, but to produce a fusion of the two, which is reminiscent of the *mu lian li*.⁹²⁹

Grafting, in the cultivation of flowering plants under the Song, provides a remarkable example of originality, and the descriptions provided offer equally precious accounts of the practice, but the monographs devoted to fruit-bearing and ornamental trees and agricultural treatises also make interesting contributions to the history of the grafting of plants.

Although an earlier monograph devoted to the litchi, the *Li zhi pu* 荔枝譜 (Treatise on the Litchi) (c.1060) by Cai Xiang 蔡襄, contains no mention of grafting, Han Yanzhi 韓彥直, in his *Ju lu* 橘錄 (Tangerine Record) (1178), does describe a process for ring-grafting:⁹³⁰

Start by taking the pips of a sour orange (*zhu luan* 朱欖)⁹³¹ and wash them thoroughly; sow them in scorched earth; after one year, the plants are called *gan dan* 柑淡.⁹³² Their roots are

⁹²⁶ Anon. (1993a, p. 61).

⁹²⁷ *Tu shu ji cheng*, juan 287, p. 55b.

⁹²⁸ Anon. (1993a, p. 174).

⁹²⁹ See above, p. 278.

⁹³⁰ Anon. (1993a, Volume 1, p. 231) See the presentation of this important text, SCC Volume 6, Part 1, pp. 368–77.

⁹³¹ *Citrus aurantium* L. (Yu Dejun 1982, p. 289).

⁹³² An approximate translation of this term is ‘incomplete mandarin tree’.

very bushy and entangled; the next year, they are thinned out and transplanted. After yet another year, when the trunk is as thick as a child's fist, in the course of the spring months, one proceeds to grafting by taking one-year-old twigs exposed to the south from excellent mandarin trees (*gan* 柑)⁹³³ and tangerine trees (*ju* 橘),⁹³⁴ in order to 'affix' (*tie* 貼) them. Saw at the level of one foot from the ground, separate⁹³⁵ (*ti* 剔) the skin, graft the two twigs on either side, taking care not to disturb their root; carefully take handfuls of earth and heap it up between them as protection against the rain, protect the exterior with bamboo [leaves] (*ruo*),⁹³⁶ bind with hemp. The tension of the binding and the height of the graft must be in accordance with the *qi*, the soil and the climate. As for the way to graft trees, this can be found in the *Sì shì zuan yao*, which is the text that rules old gardeners . . . If one allows much time to elapse without grafting, the flowers and fruits revert to being those of the sour orange tree . . .⁹³⁷

The section devoted to agriculture in the encyclopaedic collection *Fen men suo sui lu* 分門鎖碎錄 by Wen Ge 溫革,⁹³⁸ which was composed in the early years of the Southern Song dynasty – that is to say, after 1127 – contains several passages devoted to the grafting of trees. The first concerns mulberry trees.⁹³⁹ It tells us that the mulberry trees grafted onto paper mulberry trees have 'fleshier' and larger leaves and that, when pear trees are grafted on to mulberry trees, they produce more tender and finer fruits. One remark that testifies to the quality of these observations is the statement that for the propagation of mulberry trees, it is not worth layering or dividing the roots and stems. The second chapter,⁹⁴⁰ entitled 'Jie mu fa' 接木法 (Method for Grafting Trees), is reproduced in its entirety from the text of the *Sì shì zuan yao*,⁹⁴¹ apart from one or two details and minor remarks; the only addition, here shown in bold type, concerns the text's last sentence:

Grafts of plants whose seeds, within the fruit, belong to corresponding categories are always successful, such as apple trees⁹⁴² or pear trees⁹⁴³ onto flowering quinces⁹⁴⁴ and flowering apple trees⁹⁴⁵ or chestnut trees⁹⁴⁶ onto oak trees,⁹⁴⁷ or **Chinese wax myrtle**⁹⁴⁸ onto **mulberry trees**.

More information concerning grafting is to be found in the section entitled 'Jie guo mu fa' 接果木法 (Method for Grafting Fruit Trees). We are told that when grafted

⁹³³ *Citrus reticulata* Blanco (= *C. nobilis* Lour.). ⁹³⁴ *Citrus reticulata* Blanco var.

⁹³⁵ The precise meaning of this term is 'to strip the flesh from the bones'.

⁹³⁶ A small bamboo with large leaves, *Indocalamus tessellatus* Munro Keng. In Geng Yili (1965, p. 15).

⁹³⁷ Hu Daojing (1985b, p. 7).

⁹³⁸ See pp. 402–5 above for a presentation of the horticultural section. For an analysis of this text, see Hu Daojing (1985b (2), pp. 1–9).

⁹³⁹ The pages of the manuscript preserved in the Shanghai Library are not numbered. I give a personal numbering starting with the first page of the text.

⁹⁴⁰ Pp. 17b–19a.

⁹⁴¹ See pp. 503–5 above. The passage corresponds to section 49 of Mou Qiyu's edition (1981b, p. 22).

⁹⁴² *Lín qín* 林檎, *Malus asiatica* Nakai. In anon. (1977b, Fig. 2535); Yu Dejun (1982, p. 100).

⁹⁴³ *Lǐ* 梨, *Pyrus* sp. ⁹⁴⁴ *Mù guā* 木瓜, *Chaenomeles lagenaria* (Loisel) Koidz.; in anon. (1977b, Fig. 0700).

⁹⁴⁵ *Hǎi táng* 海棠, *Malus micromalus* Mak. ⁹⁴⁶ *Lǐ* 栗, *Castanea mollissima* Bl.; in anon. (1977b, Fig. 3731).

⁹⁴⁷ *Lǐ* 櫟 today designates *Quercus acutissima* Carr.; in anon. (1977b, Fig. 5433). But here this term probably has a generic sense.

⁹⁴⁸ *Táng méi* 楊梅, *Myrica rubra* (Lour.) Sieb. et Zucc.

onto plum trees, peach trees produce red, sweet fruits and that plum trees grafted onto peach trees turn into peach trees. One particular grafting method, that of a vine on to a jujube tree, is described as follows:

If one wishes a vine to have plump fruits, plant it close to a jujube tree. In the spring, make a hole in the trunk of the jujube tree and place in it a shoot from the vine. After two or three years the vine shoot, as it grows, fills the hole and seals it. One can then cut off the vine plant whose stem, nourished by the root of the jujube tree, produces fruit as plump as the jujubes. That is how cultivation proceeds in all northern regions.⁹⁴⁹

The text then considers the effects of other types of grafting. When grafted onto a peach tree, the Japanese apricot tree produces fragile fruits; peach trees grafted onto apricot trees have larger peaches. After three grafts, kakis no longer have stones. The various citrus fruit trees that are grafted onto hardy orange (*Poncirus*) trees grow easily. Whatever is grafted on the side exposed to the south and close to the base produces plentiful fruits.

In the last part of the *Nong shu* 農書 (Book of Agriculture) (1149) by Chen Fu 陳敷,⁹⁵⁰ there is a mention of an original grafting by proximity that is recommended for the cultivation of mulberry trees. This author, who adopted a critical view of his predecessors,⁹⁵¹ recommended the following method for planting mulberry trees:⁹⁵²

Having sown the seed densely, take the young seedlings, cut their stems above the roots and also cut the principal root, retaining only the lateral ones; arrange the plants in threes in a triangle [literally, in the shape of the character *pin* 品] and link them closely together; in this way, they will grow together inside a vertical bamboo tube as wide as a big toe and three feet long. The tops of each of these tubes are covered by a piece of tile to prevent rain from rotting the stems. Leave a space of two feet between each of these groups of three. Eventually, the three stems join to form a single trunk that is particularly robust and grows easily and that should be transplanted at the beginning of the following year.

The author also mentions the possible use of another mulberry tree (*hai sang* 海桑) that is multiplied by layering and is destined mainly for the production of fruit. To raise silkworms, he advises grafting, as for fruit trees, onto 'good mulberry trees' (*hao sang* 好桑) in order to procure leaves that are much better but that wither easily. In the *Mei pu* 梅譜 (Treatise on the Japanese Apricot Tree) (c.1186),⁹⁵³ Fan Chengda 范成大 mentions a *jiang mei* 江梅 that comes from a stone, grows spontaneously and is neither propagated by cuttings nor grafted. Although he does not specify, it is reasonable to suppose that this was used as stock.⁹⁵⁴ However, he does mention several other varieties that are always grafted on to other *mei*. Finally, Chen Si 陳思,

⁹⁴⁹ Li Shizhen (1975–81, Volume 3, p. 1885) attributes the information to the *Wu lei xiang gan zhi*.

⁹⁵⁰ See Mou Qiyu (1981a). ⁹⁵¹ See his introduction and *SCC* Volume 6, Part II, 48.

⁹⁵² *Nong shu*, Cong Shu Ji Cheng Jian Bian edn, p. 20. See also pp. 31 (original text) and 34 (translation into modern Chinese), in Mou Qiyu (1981a).

⁹⁵³ Anon. (1993a, Volume 1, p. 1).

⁹⁵⁴ We are told in the *Jia pu chi*, which is probably much later than the treatise by Fan Chengda, that the wild Japanese apricot tree (*ye mei*) is called *jiang mei* and that, when grafted onto a China-berry (*lian shu*), it is called *mo mei* 墨梅.

in his *Hai tang pu* 海棠譜 (Treatise on the Flowering Apple Tree) (1259),⁹⁵⁵ citing the *Hai tang ji* 海棠記 (Memoir on Flowering Crab Apple Trees) (c.1050) by Shen Li 沈立, reports that trees produced from seed grow slowly and only start to flower after ten or so years. He notes that flower cultivators in the capital encourage abundant flowering by grafting young branches on to pear trees. This text is of particular interest, for it reinforces the matrimonial symbolism of grafting that we have noted earlier. The process of grafting is expressed by implicitly comparing the grafted scion, the 'young twig' (*nen zhi* 嫩枝), to a son-in-law who goes to live in his wife's family in order to continue the family line in the absence of a male descendant. This is expressed in Chinese by the term *zhui* 贅. What the text says literally is that 'grafters'⁹⁵⁶ in the capital join the young twigs to the pear trees and turn them into adopted sons-in-law'.⁹⁵⁷

The *Zhong yi bi yong* 種藝必用 by Wu Zan 吳攢 or Wu Yi 吳擇, which was probably completed in roughly the same period,⁹⁵⁸ together with its supplement, the *Zhong yi bi yong pu yi* 種藝必用補遺, by Zhang Fu 張福, which must have appeared before 1280, the year when its author died, are two texts that are ignored by bibliographies but that do figure in the *Yongle da dian*. An introduction to them and a first edition have been produced by Hu Daojing.⁹⁵⁹ Several passages in this text refer to grafting as well as to other modes of plant propagation. For mulberry trees, they recommend layering or the division of roots and stems rather than sowing seed.⁹⁶⁰ Similarly, for multiplying favoured fruit trees the advice given is to propagate by cuttings rather than sowing seed. To do so, the advice given is, within the first ten days of the third month, to cut young branches as thick as a thumb and as long as one foot five inches and to stick them into a taro; failing a taro, the root of a radish turnip (*luo bo*) or of a radish (*man*) *qing* 蔓青 will do. One should not sow the stones of grafted trees.⁹⁶¹ These few remarks show that, in the absence of any knowledge of genetics, cultivators had, through observation, devised sure means of propagation and maintaining varieties of plant without resorting to sowing seed and by choosing various forms of asexual multiplication. A number of positive results of grafting are noted. We learn that if a mulberry tree is grafted onto a paper mulberry tree,⁹⁶² the leaves become thick and large; and pear trees grafted onto mulberry trees produce fine sweet fruit. As a stock, the hardy orange (*Poncirus*) tree⁹⁶³ is suitable for grafts of orange, mandarin and lemon trees.⁹⁶⁴ When grafted onto a peach tree, a Japanese apricot tree produces fruits that are more tender, and a peach tree grafted onto an apricot tree produces large fruits.⁹⁶⁵ When a Chinese wax myrtle⁹⁶⁶ is grafted onto a mulberry tree, the fruits have no acidity.⁹⁶⁷ The

⁹⁵⁵ Anon. (1993a, Volume 1, p. 33). ⁹⁵⁶ Literally, the 'grafters of flowers', *jie hua gong* 接花工.

⁹⁵⁷ *Du xia jie hua gong yi nen zhi fu li zhui zhi* 都下接花工以嫩枝附梨贅之, Chen Si, p. 33, in anon. (1993a).

⁹⁵⁸ Hu Daojing (4), p. 12. ⁹⁵⁹ Hu Daojing (5) (1962) (4) (1963). ⁹⁶⁰ *Zhong yi bi yong* no 28/p. 20.

⁹⁶¹ *Zhong yi bi yong* no 57/p. 27. ⁹⁶² *Gu* 穀, *Broussonetia papyrifera* (L.) Vent.; anon. (1977b, Fig. 4754).

⁹⁶³ *Poncirus trifoliata* (L.) Raf.; anon. (1977b, Fig. 3162). ⁹⁶⁴ *Zhong yi bi yong* no 60/p. 28.

⁹⁶⁵ *Zhong yi bi yong* no 95/p. 35.

⁹⁶⁶ *Yang mei* 楊梅, *Myrica rubra* (Lour.) Sieb. et Zucc. Feng Songming (1983, p. 358).

⁹⁶⁷ *Zhong yi bi yong* no 97/p. 35.

particular procedure that is said to be current in northern regions and is described for grafting a vine onto a jujube tree in order to obtain grapes as large as jujubes⁹⁶⁸ is identical to that described in the *Fen men suo sui lu* which has already been noted. There are also two mentions of double grafting. It is claimed that the stones of fruits in general become smaller and sterile,⁹⁶⁹ and a kaki that has been grafted three times produces totally seedless fruit.⁹⁷⁰ This suggests that we should seriously consider the hypothesis of double-grafting processes at a very early historical date, since one of the varieties of jujube tree cited in the *Er ya* is described as sterile (*wu shi zao* 無實棗).⁹⁷¹

The striking similarity between certain parts of this text and passages in the *Fen men suo sui lu* suggests that the *Zhong yi bi yong* may have been inspired by the latter text or even that the two works drew upon the same references.

With the advent of the Yuan dynasty, interest in grafting becomes increasingly noticeable, no doubt because of the need to be able, as soon as possible, to overcome the setbacks that warfare had inflicted upon arboriculture generally. The double advantage that grafting had over the sowing of seed was that it speeded up the development of trees and also made possible the propagation and maintenance of the varieties considered to be the most advantageous – in the case of mulberry trees, both for the leaves and for the fruit. As early as 1273, even before total victory over the Song, the Agricultural Bureau, *Si nong si* 司農司, set up by the Mongol Emperor Khubilai, had, as we have seen, compiled a book written in Chinese, the *Nong sang ji yao* 農桑輯要 (Fundamentals of Agriculture and Sericulture), which was designed to encourage the reconstruction of agriculture, suggest new crops and, in particular, stimulate the production of silk in the northern regions of China.⁹⁷² Two chapters of this book are devoted to grafting.⁹⁷³ The one, entitled 'Jie huan' 接換, 'Exchange through Grafting', is part of *juan* 3, which is devoted to the cultivation of mulberry trees; the other, 'Jie zhu guo' 接諸果, 'Grafting All Fruit Trees', comes at the end of *juan* 5, following a study of the cultivation of vegetables and fruit. The first of those two sections starts with a general remark pointing out that for a graft to be perfect one needs to carry it out at the right moment, possess the desired know-how, bind the graft securely and provide protection for it.⁹⁷⁴ The best moment is ten days before the spring equinox, the next best is the five days preceding or following that period. The text provides a synthesis of the techniques of grafting with a view to improving old trees with 'thick trunks and branches, short twigs and thin leaves'. One may wonder what is the point of grafting when pruning is certainly the most

⁹⁶⁸ *Zhong yi bi yong* no 90/p. 34.

⁹⁶⁹ *Zhong yi bi yong* no 65/p. 29.

⁹⁷⁰ *Zhong yi bi yong* no 99/p. 35.

⁹⁷¹ I am interpreting *wu shi zao* 無實棗 literally, as 'jujube tree without fructification', designating a variety that is not able to produce fruit – that is to say, without stones – and not as a 'jujube tree without fruit', which it seems to me would be absurd given that this is a variety that is cultivated for its fruit.

⁹⁷² See *SCC* Volume 6, Part II, pp. 71–2.

⁹⁷³ I am using the text established by Shi Shenghan (1982).

⁹⁷⁴ Shi Shenghan (1982, pp. 92–5).

effective way of regenerating old trees.⁹⁷⁵ The answer to that is provided in a note right at the beginning of the text, where the advice given is to graft branches of the mulberry trees of Lu (*lu sang* 魯桑) onto the trunks of the mulberry trees of Jing (*jing sang* 荆桑).⁹⁷⁶ This long note includes other very interesting information about the concept of plant physiology in 13th-century China and the interest in grafting. It notes that, just as the fruits of a naturally spontaneous tree are small, with an unpleasant taste, unlike those produced by a grafted tree, a similar effect characterises mulberry trees, which are, as we should remember, mostly cultivated for their leaves. Furthermore, it notes that during the winter,

the vital energy of trees (*sheng qi* 生氣) is preserved in between the bones and the flesh, whereas in the spring it circulates within the flesh. As the vital energy circulates, the saps follow it. It is like the pulse of human beings which, during the night, is immersed but in the daytime emerges⁹⁷⁷ and is moved by the blood and the *qi*. Within the skin (*pi fu* 皮膚) and outside the 'hard bone' (*jian gu* 堅骨), that which is dark green and wet is the flesh (*ji rou* 肌肉) of the tree. When it develops, *qi* and the saps are in movement, the twigs and buds are pure and fine and fuse with the rough nature of the trunk, causing it to become beautiful. The two *qi* communicate and there is a progressive transformation; what has been described as rough purifies itself until beauty and purity are attained.⁹⁷⁸

It is noticeable that the crucial zone for the development of trees, the cambium, is clearly recognised, its role being interpreted by analogy with parts of a human or animal body, for all the technical vocabulary refers to these.

Four types of grafting are listed, *cha jie* 插接, 'grafting by insertion', ring grafting; *pi jie* 劈接, 'grafting by opening', a grafting by incrustation; *ya jie* 壓接, 'grafting with a "fly"',⁹⁷⁹ also known as *tie jie* 貼接, 'grafting by sticking' or sometimes *shen xian jie* 神仙接, 'the grafting of genies', a graft effected by plating, in the shape of a shield; and finally *pi jie* 批接, 'a responding graft', also called *da jie* 搭接, 'a graft by reciprocal union' or a simple English graft. Now let us consider in detail each of these techniques as the text describes them, in the absence of any original illustrations, if any such illustrations ever existed.

Grafting by insertion, ring grafting (*cha jie* 插接) [Fig. 174]

⁹⁷⁵ My thanks go to MM Jacques Beccalatto and François Moulin, the gardeners of the King's Vegetable Garden in Versailles, for their precious remarks and their answers to my questions, which helped me to gain a better understanding of the original Chinese texts.

⁹⁷⁶ Lu, depending on the periods, designates either the present-day province of Shandong or else the southern part of it. Jing designates the Kingdom of Chu, during the Spring and Autumn period, the present-day region of the provinces of Hunan and Hupei.

⁹⁷⁷ *Ye chen zhou fu* 夜沉晝浮.

⁹⁷⁸ Shi Shenghan (1982, p. 92), English version of author's translation into French.

⁹⁷⁹ According to Shi Shenghan (1982, p. 113, n. 67), in this context the term *ye* 壓, which means 'dimple' in current usage, should be pronounced *ya*. Here it designates a tiny jewel made from a delicate scrap of silk or a pierced flake of gold that elegant ladies of the Yellow River Valley stuck on to their cheeks, in the 4th and 9th centuries. These call to mind the tiny scraps of black taffeta, known as 'flies', that appeared in the European 17th century, and that women would stick on to their faces in order to set off their pale complexions, hence my choice of the translation.

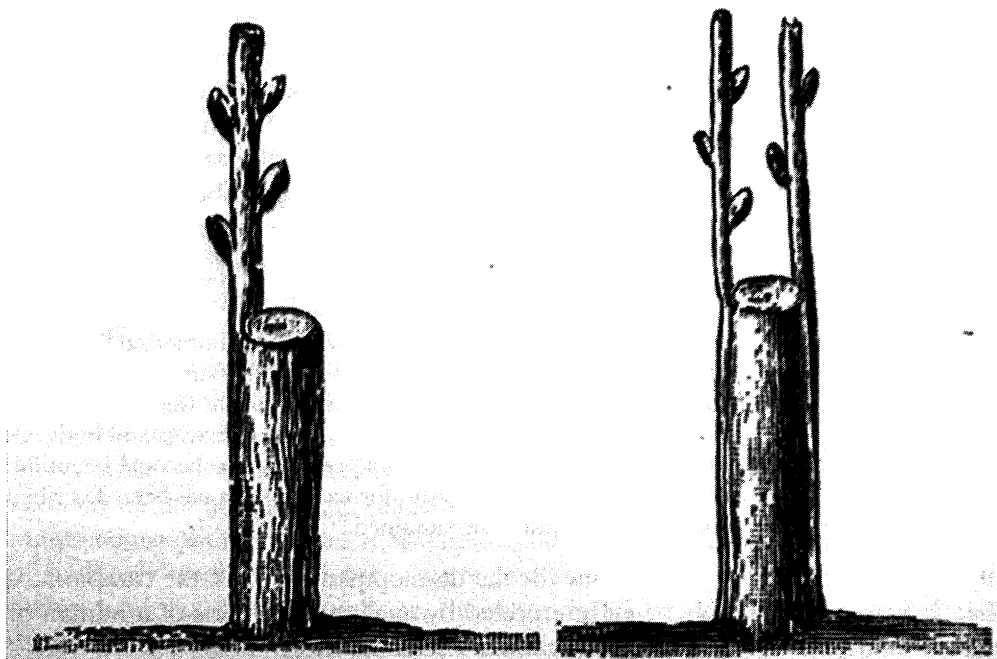


Fig. 174. Ring grafting (*cha jie* 插接).

Saw close to the earth; on the anvil-plate (*zhen pan* 砧盤) within the flesh, right up against the bone push in a bamboo claw to a depth of an inch and a half (note: insert either by pushing or by hammering. The dimension of the claw depends on the size of the scion to be grafted. This bulges on one side and is flat on the other. It is cut in the shape of a [beveled-edged] horse's ear. To use it, place in your mouth to warm it; when you insert it, place the flat edge against the bone. The part that has been sawed is the anvil-plate. The hard wood is the bone. That which is tender and dark green is the flesh. Use a fine saw so as not to wound it). The height of the scion may be five inches; its root one and a half inches. Using a thin-bladed knife, cut halfway through the root so as to give it the shape of a 'judge's hat' (*pan guan tou* 判官頭) [Fig. 175]. On the other side cut the bone in the shape of a horse's ear; using a knife, cut the skin and scrape to reveal the flesh (note: cut gently so as not to wound the muscle). Remove half or more of the thinned bone at the end of the horse's ear; the dark green flesh reaches halfway up to the tip of the bone. Place the scion in your mouth, to warm it; thanks to the human *qi*, it takes [literally, 'lives'] more easily (note: at this time, abstain from alcohol and foods with a strong taste). Remove the claw, take the other half of the dark green flesh. Wrap it round the tip of the horse's-ear-shaped scion and insert it. It must be very tightly joined. On the anvil-plate it is possible to graft two or three twigs (*tiao* 條) (note: the bone of the scion and the bone of the tree meet; the flesh of the scion and that of the tree meet; the saps (*jin ye* 津液) of the tree pass into the flesh; if this does not happen, most grafts die, as they do if one does not surround the tip of the horse's ear with half of the



Fig. 175. 'Judge's hat' (*pan guan tou* 判官頭), from Shi Shenghan (1982, p. 113, note 59).

dark green flesh). Seal it with a mixture of fresh cow-dung and earth, dampen and pack it round. You can leave one or two eyes at the tip of the scion. The depth of the earth should be three or four inches [ten to twelve centimetres]. Surround with thorny branches for protection. When the scion has produced some young shoots and has grown to a height of one or two feet [between thirty-three and sixty-six centimetres], keep only two or three shoots. Plant a prop alongside to guide the young shoots, which should be tied to it with string or with *Pueraria*⁹⁸⁰ stalks (note: without this they may be broken by the wind and rain).⁹⁸¹ When the shoots eventually become vigorous, retain only two of them; this will later produce a tree with two trunks. Growth may attain eight to nine feet, or even more each year. When the tree is as tall as a human being, shorten the little twigs but do not touch the lateral branches until the winter, at which point retain no more than three or four branches, each one foot long (note: but this is not an absolute rule; judge the length depending on the vitality and size of the tree). By the following year, these become real branches producing twigs; these must be thinned out and standardised. By the autumn it has become a tree. Grafting by incrustation (*pi jie*) is also possible (note: see below).

Another method. Dig down until you can see the roots; cut the lateral roots with an axe, disengage the main root at the centre, remove the roots that surround it. Using a fine-toothed saw, create an anvil-plate. On each anvil-plate, graft two or three scions by insertion or incrustation. When the young shoots appear, if they are too dense do just what is necessary to wait for the next year, leaving only the thickest branch in place. The rest can be removed and turned into *zai zi* 栽子 ['young plant cuttings'] that can be replanted elsewhere (note: provide props as before).

'Grafting by opening', grafting by incrustation (*pie jie* 劈接) [Fig. 176]

Begin by sawing the trunk close to ground level. Then, starting at one and a half inches from the bottom, move up to left and to the right, making oblique cuts up to the plate, using the point of a sharp knife; the base should be pointed, the top one finger wide. Remove the central part that has been cut out (note: it is shaped like a crow's beak, the edges have oblique surfaces, the pointed tip is not deep and the cut becomes deeper on the way up until it is half a finger deep at the level of the plate). The scions may be up to five inches long and as thick as a finger; at the base remove one half, one inch in height; cut both sides of the

⁹⁸⁰ Shi Shenghan (1982, pp. 92–5), English version of author's translation into French.

⁹⁸¹ *Ge, Pueraria lobata* (Willd.) Ohwi; see anon. (1972–6, Volume 2, p. 502).



Fig. 176. Grafting by incrustation (*pi jie* 劈接).

remaining half which is shaped like a buckwheat seed.⁹⁸² Put the pointed part in your mouth to nourish and warm it. Encrust it in the slits at the sides of the anvil-plate and squeeze hard. The flesh of the old tree and that of the grafted scion must touch. A variable number of stems may be grafted in this way (note: depending on the size of the plate).

Next, the author describes the procedure mentioned earlier that is designed to protect the scions. He then continues as follows:

Whether one is grafting large or small trees (note: for large trees, grafting by incrustation is preferable, for small ones grafting with a 'fly' or grafting in mutual union is best) when the graft is close to the ground, seal it and proceed as described above; when it is on an anvil-plate cut into the trunk halfway up, the surrounding area must be sealed by wrapping it in paper or else in a piece of waste matting cut into a pointed shape at the top; inside this you should put damp earth to feed the scions and block all draughts (note: the matting may be replaced by a pot or vase of earth open at the bottom). As soon as the earth dries, water it. When the twigs develop above the surface of the earth, some of the earth may be removed. In the autumn, when they have grown well and the tip of the graft is well fixed, the earth is no longer needed (note: if all the grafted scions are alive, decide how many to leave, depending on the (desired) number of lateral branches and the strength of the tree).

Grafting with a 'fly' (*ya jie* 壓接), patch budding [Fig. 177]

This may be done on lateral branches cut to a length of about one foot (note: this is not a definite length; judge what it should be according to the size and vigour of the tree). On the scion, half an inch away from a bud, using a pointed knife, cut away a square of skin and flesh right down to the bone. Carefully remove this square fragment bearing an eye, skin and flesh. Put a little in your mouth, take it out and press its wetness on to the lateral branch; replace it in your mouth. With a pointed knife, cut out the skin and flesh around the edge of the 'wet scar', and remove it. Apply to the visible bone the skin of this 'fly' that is on the scion to be grafted (note: the word 'eye' is used in its good sense); bind together the upper and lower parts with a thin piece of fresh skin from the mulberry tree (note: the tension must be carefully judged. If it is too tight, the vital *qi* will not be able to pass, if it is too loose, there will not be perfect contact and survival

⁹⁸² This means a triangular section.

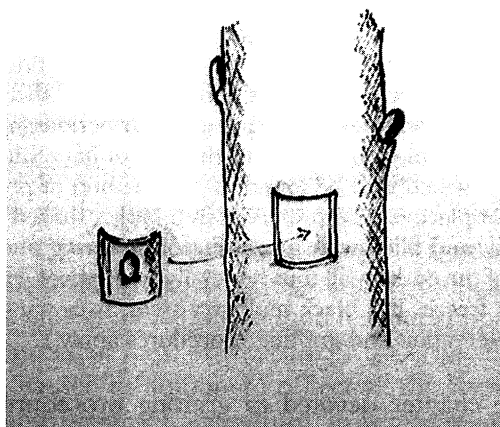


Fig. 177. Patch budding (*ya jie* 壓接).

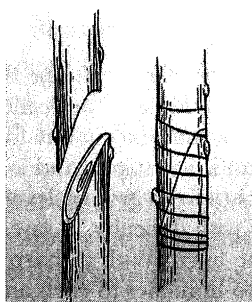


Fig. 178. Splice graft (*da jie* 搭接).

will be hard); spread all four sides of the eye with cow-dung and mud. Judge how many 'flies' to apply depending on the size of the tree.

This particular form of grafting onto a shield, known as 'onto a sleeping plate', appears for the very first time in this text. The author then describes a grafting method for young shoots, which is known as 'simple English grafting'.

Graft small twigs bearing buds (note: one can use 'grafting by reciprocal union' (*da jie*) [splice graft]) [Fig. 178].

In a bed of one-year-old Jing mulberry slips, cut about three inches from the ground in the shape of a horse's ear [bevel-edged]. Take a scion from a Lu mulberry tree of the same size and make a similar bevel-edged cutting. Bring these two horse's ears together and bind

them with thin mulberry-tree skin, seal with cow-dung and mud,⁹⁸³ then press together. When the buds emerge from the earth, two buds may be kept. In autumn the plant reaches the height of a tall person. In the following year, it can be transplanted into a garden, where it will be raised.

Taking and preserving scions for grafting

If the scions are available close at hand, one can take them at the time of grafting; if they are far away, the time to cut the twigs is between the solar periods (*jie qi* 節氣) of the twelfth month.⁹⁸³ (Note: all the information relating to the way of harvesting them and caring for them is the same as that which is to be found in ‘the method of propagation by cuttings’). Scions taken in a distant place can be preserved in a basket soaked in the juice of crushed kakis, containing no oil, and filled with a layering of flowering and fruit-bearing bulrush stems.⁹⁸⁴ The outside of the basket will thus be totally waterproof, even after a journey of a thousand *li*, nor can it freeze. For black mulberry trees, two-year-old twigs are the most suitable. The same preservation and grafting procedures apply.)

This is where the chapter devoted to grafting procedures recommended for mulberry trees comes to an end. It is the earliest systematic account of the various types of grafting practised and judged to be beneficial to mulberry trees. The precision of the descriptions conveys the strength of the author’s didactic concerns. The book’s other section relating to grafting is devoted to fruit trees. Here is a translation.

The grafting of all fruit trees⁹⁸⁵

The *Si shi zuan yao* 四時纂要 runs as follows: ‘In the first month, trees as thick as an axe handle or an arm are suitable for grafting; they are called “anvil of a tree” or “tree anvil” (*shu zhen* 樹砧). If the anvil is larger, it must be cut one foot from the ground, for otherwise, lower down, the force of the ground is too strong and is harmful to the grafted tree. If it is smaller, cut it at seven or eight inches from ground level. In the case of a small high anvil, the *qi* of the ground responds only with difficulty. A saw with fine teeth should be used, for otherwise it wounds the skin of the anvil. With a sharp knife, make symmetrical slits one inch deep. Symmetrically, graft two branches to each anvil. Wait until leaves appear, then eliminate the weaker branch. You must choose young branches facing southward on the tree, as thick as a tendon and four inches long. Branches facing northward produce only a few fruits. The scion should have two knots, or be two years old before it can be grafted. When grafting, pierce the slightly bevelled extremity and push it into the edge of the anvil to a depth of five inches. At this point the skin of the scion must be at exactly the same level as that of the anvil. Furthermore, the tension must right; if it is too loose, the male *qi* cannot react; if too tight, the excess of force smothers: everything depends on a subtle assessment. Once it is inserted, take a piece of the skin of a tree that is the same colour, about one foot long and about two or three *fen* wide, and wrap this around the scions and the wounds on the edge of the anvil to prevent water or rain from penetrating. Next, seal with clay,

⁹⁸³ These were the *Xiao han*, ‘Little cold’ (c.6 January), and the *Da han*, ‘Big cold’ (c.21 January); the dates may vary by one day, depending on the years.

⁹⁸⁴ *Pu bang rang* 蒲棒穰, according to Shi Shenghan (1982, p. 102, n. 63), designates a rich accompaniment made from a mixture of an ear of wheat, fruits, seeds and the remains of bulrush flowers (*Typha sp.*).

⁹⁸⁵ Shi Shenghan, English version of author’s translation into French.

covering the entire surface of the anvil. When doing this, cover the top with paper kept in place by hemp, to prevent the mud from dripping. If leaves emerge from the anvil, eliminate them. Smoke the base of the anvil and surround it with thorny branches, to keep animals away. Grafts such as this take easily after they are watered by the spring rains. [Grafts of] apple trees and pear trees onto quince trees, or of chestnut trees onto oaks, and of all those that have within their fruits seeds of similar categories, are always successful. It is all a matter of categories!

Obviously, this treatise provides a very clear description of a synthesis of technical knowledge. In order to do this, the authors have consulted a large number of earlier texts, sixteen to be precise, foremost among them the *Qì mǐn yáo shu*, eighty-nine citations from which appear in the 186 paragraphs of the text.⁹⁸⁶ This handbook thus constitutes above all a compilation, as soon becomes apparent as one reads it, bearing in mind the texts that have preceded it.⁹⁸⁷ Its originality lies mainly in the didactic purpose that caused its authors to collect all the knowledge considered to be useful for the reconstruction of agriculture, in response to the demands of the emperor; and thanks to its official nature, it benefited from being widely diffused, which made it possible to fulfil its role of popularisation.⁹⁸⁸ The relative importance of the subject of grafting in this text may well not be fortuitous, for symbolically the new young dynasty had just grafted itself on to the age-old trunk of the Chinese empire.⁹⁸⁹

About forty years later, a new description of the techniques of grafting (*jiē bo* 接博) appeared in the chapter devoted to the cultivation of plants, 'Zhong zhi pian' 種植篇, in the *Nong shu* 農書 (Book of Agriculture) by Wang Zhen 王禎, the short preface to which is dated 1313.⁹⁹⁰ First, the author considers mulberry trees, which, for peasants, are of the first importance from an economic point of view. He makes some interesting points about what is cited in earlier works; and, regarding the two major categories among all the various varieties that have already been mentioned, those of Lu 魯 and Jing 荆, he draws distinctions that explain the advantage of grafting the one upon the other. He writes as follows:

The Jing mulberry trees produce many mulberries, the Lu mulberry trees produce very few. The former have thin, pointed leaves, with lobed edges. All those with branches, trunk, twigs and leaves that are strong belong to the Jing category. Those with round, thick leaves full of sap belong to the Lu category. [Those of] the Jing category, with solid roots and great heart, can endure for a long time and are fine trees. Those in the Lu category, with quite different qualities, have a short life and are cultivated as bushes.⁹⁹¹ However, since the twigs and leaves of the Jing mulberry trees are less abundant than the leaves of the Lu trees, one grafts twigs of the Lu trees and thereby obtains both longevity and abundance.⁹⁹²

⁹⁸⁶ Wang Yuhu (1956, p. 80).

⁹⁸⁷ I have deliberately not pruned my translation of these repetitions, the better to show, in a concrete fashion, the way in which such knowledge was transmitted by a 'piling up' of earlier citations, themselves in many cases already the product of even earlier citations.

⁹⁸⁸ See Bray, *SCC* Volume 6, Part II, p. 72.

⁹⁸⁹ See Métaillé (2007a).

⁹⁹⁰ Wang Yuhu (1981, p. 52).

⁹⁹¹ These are *dì sāng* 地桑, literally 'mulberry trees of the soil'.

⁹⁹² Wang Yuhu (1981, p. 52).

Wang Zhen then explains the grafting techniques.⁹⁹³ He begins by praising the advantages of such practices both for mulberry trees and for fruit trees and, as before, he sets out the fundamental principles. Choose, for grafting, a fine twig facing south, check the compatibility of the categories of the scion and the stock, and use the right tools. He concludes by saying that ‘once the graft has taken, the two *qi* communicate, what is ugly becomes beautiful, the one is changed into the other and words fail to express all the advantages!’ He lists six methods: ‘grafting on the body’ (*shen jie* 身接), ‘grafting on the root’ (*gen jie* 根接), ‘grafting on the skin’ (*pi jie* 皮接), ‘grafting a branch’ (*zhi jie* 枝接), ‘grafting with a “fly”’ (*ya jie* 壓接) and ‘grafting by joining’ (*da jie* 搭接). The first two are identical, only differing in the height of the stock, respectively at shoulder height and at five inches above ground level, but in both cases this is a matter of ring grafting. Two methods have already been described in the *Nong san ji yao*: the insertion of two strong scions, without breaking the bark of the stock or ‘graft-receiver’, for a ‘graft by insertion’ (*cha jie*), and the incrustation of scions in a triangular pared space on the sides of the stock, where it is a matter of a ‘grafting by opening’ (*pi jie*). Wang Zhen recommends a third method that consists in placing the scions in two vertical incisions in the sides of the stock’s pared area, the anvil-plate (*pan zhen* 盤砧). In order to do this, having broken the bark to reach the wood, to a depth of about an inch and a half, using a small pointed knife, you use a piece of bamboo that you insert in order to measure the depth. Then you take the scion to be grafted, which should be about five inches long, and sharpen its tip, which you then place in your mouth so that the saliva assists its *qi*. The author also stresses the need to bring together the ‘skin and flesh’ of the scion and the stock; that is to say, the need to stick together the generating zones of both. Next, as we have already seen, you need to wrap bark around it, and seal it with cow-dung and mud, leaving two eyes – which are today considered to be ‘sap-extractors’ – ‘in order to draw out its *qi*’ (*xie qi qi* 洩其氣). In the case of a root grafting, the procedure is identical except that the graft is buried in the earth and surrounded by thorny jujube branches, to protect it from animals. A ‘skin graft’ is a type of shield budding, in which the stock is sliced apart above the grafted point when the grafted scion starts to develop correctly. The ‘branch graft’ is very similar to the former type but is effected not on the trunk but on the branches. A graft with ‘a fly’ is identical to that described in the *Nong sang ji yao*. Finally, a ‘graft by joining’ (*da jie* 搭接) is an English graft that is carried out on young stock at a height of about three inches above ground level. It is worth noticing that Wang Zhen is innovative on two points: ring grafting by incision and shield budding. He concludes the passage in what is by now the classic manner, stressing the need for anyone wishing to improve his lot to adopt such practices.

Unlike the above text, the *Nong sang yi shi cuo yao* 農桑衣食撮要 (Selected Essentials of Agriculture, Sericulture, Clothing and Food) (1314) by Lu Mingshan

⁹⁹³ Wang Yuhu (1981, pp. 54–5).

魯明善 is not an agricultural treatise that is complete in itself but, as has already been noted, complements the *Nong sang ji yao*. Grafting is the subject of only its last three rubrics, which concern the activities of the second month. The way to graft all fruit trees is described. After creating in the earth a 'wall' of rows of ridges, sow the stones of wild peach trees. The next year, thin out the young trees, retaining one every two paces. After two years, cut the tips of the branches obliquely so as to fix in them, with an 'English' graft, the scions of peach trees, apricot trees, plum trees and other fruit trees. Next, two kinds of graft are described, the 'graft onto loins' (*yao jie* 腰接) and the 'graft onto the root' (*gen jie* 根接). The former is a ring graft: create a 'wood anvil' (*mu zhen* 木砧) by cutting the trunk one foot from ground level if the tree is large and seven or eight inches above the ground if the tree is more slender, then graft two scions diametrically opposite each other and when the leaves emerge retain only the more vigorous one. The advice given is to graft by cutting into the bark for grafts of pear trees and apple trees (*lin qin*) onto the wild pear tree (*du*), and by inserting the scions under the bark when grafting a chestnut tree onto an oak. When grafting onto a root, the scions are inserted into a trunk that is sawn at ground level, as has been described earlier.

The *Zhong shu shu* 種樹書 (1379) (Book on the Cultivation of Trees),⁹⁹⁴ probably composed at the end of the Yuan or at the start of the Ming period and attributed to Yu Zongben 俞宗本 or Yu Zhenmu 俞貞木,⁹⁹⁵ benefited from numerous further editions in the course of the Ming and the Qing dynasties and deserves our careful attention. In the first *juan*, the author describes the main activities during the twelve months of the year. Grafting is mentioned five times. In the first month all trees with fruits and flowers (*hua guo* 花果) are grafted. In the second month it is the turn of peach trees, Japanese apricot trees, jujube trees, mandarin trees (*gan*), tangerine trees (*ju*), mulberry trees and kaki trees. In the third month apricot trees and Japanese apricot trees are grafted. In the tenth month, again graft trees with fruits and flowers and finally, in the eleventh month, graft trees that provide wood (*jie mu* 接木). Following these remarks of a seasonal nature, the last *juan* is devoted successively to plants with flowers, to fruit trees and to vegetables. A variety of observations concern grafting. Where peonies are concerned, the advice is to appoint one person to keep an eye on the development of the grafts, for if a graft takes, it produces flowers within the year, whereas if it does not, it must be grafted again after eliminating the defective scion; in this case it will not bloom until the following year. One remark testifies to the fact that horticulturalists undertook all kinds of experiments and, in particular, attached great importance to the connection between the development of plants and a system of calendar numeration. We are told that 'if Li Chun falls on a day in *zi*, a flower of a shrub peony grafted on that day onto the root of an aubergine will be splendid in less than one month'. Comments on the effects of grafting are also to be found; thus, when grafted onto a

⁹⁹⁴ Cf Ye Jingyuan (2002, p. 32).

⁹⁹⁵ See above, pp. 406–7.

pomegranate tree, an osmanthus (*mu xi* 木犀) produces red flowers. When grafted onto China-berry (*ku lian* 苦楝),⁹⁹⁶ a Japanese apricot tree produces flowers similar to those of the *mo mei* 墨梅.⁹⁹⁷ A graft of proximity between two kinds of chrysanthemum, one white and the other yellow, produces a bloom that is half white and half yellow. As for fruits, a plum tree grafted onto a peach tree produces fruit that are red and sweet; a peach tree grafted onto a kaki tree becomes a 'golden peach tree' (*jin tao* 金桃); a peach tree branch grafted onto a plum tree produces 'peach-plums' (*tao li* 桃李). On a mulberry tree, a graft of a Chinese arbutus (*yang mei*) produces non-acid fruit, while a graft of a pear tree has crisp, sweet fruit. A graft of a peach tree onto a Japanese apricot tree produces crisp fruit, a graft of an apricot tree onto a peach tree produces large fruit. The graft of a vine onto a jujube tree is cited in the same terms as in earlier texts. The fact that a *Poncirus* (hardy orange tree) is good stock for all kinds of citrus fruit trees – *gan* 柑, *ju* 橘 and *cheng* 橙 – is also noted. Finally, a number of more general remarks indicate that after a number of grafts, stones are smaller and are no longer fertile; in the case of kaki trees they even disappear after three grafts. A tree with both flowers and fruit with a branch that has been broken by a son in mourning or a pregnant woman will not flower or produce any fruit for several years. Finally, the last paragraph of this text includes a long citation from a *Method of Cultivating Plants* (flowers), *Zhong hua fa* 種花法, by a certain Zhang Yuezhai 張約齋, who lists the periods that are propitious for the grafting of many species:

At the equinox Chun Fen and because of the exhaustion of the *qi* (*qi jin* 氣盡), it is not possible to graft. In the summer and when the male *qi* (*yang qi*) is flourishing it is not possible to sow. During the middle ten days of the first month after Li Chun (Arrival of the Spring, c.4 February), it is right to graft the cherry tree (*ying tao*), the osmanthus (*mu xi*), the Japanese rose (*bai hui*)⁹⁹⁸ and the rose bush (*qiang wei*),⁹⁹⁹ during the last ten days of the same month, graft the peach tree (*tao*), the Japanese apricot tree (*mei*), the plum tree (*li*), the apricot tree (*xing*), a variety of wintersweet (*pan chang hong la mei*), the pear tree (*li*), the jujube tree (*zao*), the chestnut tree (*li*), the kaki (*shi*), the poplar (*yang*), the willow (*liu*), and Indian lilacs (*zi wei*). During the first ten days of the second month one can graft *Michelia* (*zi xiao* 紫笑),¹⁰⁰⁰ *mian cheng* 綿橙,¹⁰⁰¹ *bian ju* 扁橘.¹⁰⁰² For the earlier grafts, the trees must be smoked in the twelfth month. In the spring, the fruit trees with flowers will produce naturally. After Li Qiu (the Establishment of Autumn, c.16 August) one can graft the Asiatic apple tree (*lin qin*)¹⁰⁰³ and also a number of cultivars of the apple trees with flowers,¹⁰⁰⁴ *chuan hai tang* 川海棠, *huang hai tang* 黃海棠, *han qiu* 寒球, *zhuan shen hong* 轉身紅, *zhu jia tang* 祝家棠, *li ye hai tang* 梨葉海棠, *nan hai tang* 南海棠. The method for grafting all the above is, at the moment when one grafts the head onto the body of the tree, to bring into close contact the respective skins and

⁹⁹⁶ *Melia azedarach* L.

⁹⁹⁷ *Mo mei* is the name given in the *Jia pu ji* 稼圃輯 (Collection on Agriculture and Gardening) to the wild Japanese apricot tree when grafted onto a China-berry tree.

⁹⁹⁸ Syn. *mei gui*: *Rosa rugosa* Thunb.

⁹⁹⁹ *Rosa multiflora* Thunb.

¹⁰⁰⁰ *Michelia figo* (Lour.) Spreng.

¹⁰⁰¹ Probably a cultivar of the sweet orange tree *Citrus sinensis* Osbeck.

¹⁰⁰² Possibly a cultivar of the *Citrus tangerina* Hort ex Tanaka, a tangerine tree.

¹⁰⁰³ *Malus asiatica* Nakai.

¹⁰⁰⁴ *Hai tang*, *Malus spectabilis* (Ait.) Borkh.

bones, tie them together with a piece of hemp skin and cover over entirely with large leaves of the small bamboo (*ruo* 箬).¹⁰⁰⁵

Following the few attempts at systematically describing grafting techniques that are offered by these publications of the Mongol Yuan dynasty, under the Ming grafting was mentioned from time to time in monographs and more regularly in horticultural and agricultural treatises.

In the *Li zhi pu* 荔枝譜 (Treatise on Litchis) by Xu Bo 徐渤 (active during the Wan Li period, 1573–1620), at the end of the first chapter of the third and last part, the reader is advised to practise grafting in order to improve trees that are not beautiful. To do this, it is necessary to saw the trunk and branches of the trees, then, with the help of a thin blade, make small incisions into which to insert the scions, so that ‘skin and flesh on both sides correspond’. Then wrap it round with the tree’s bark and cover with earth and cows’ manure. To graft, it is best to wait until the weather is clement enough to benefit from the action of *qi* in the spring warmth.¹⁰⁰⁶ However, another author, Deng Daoxie 鄧道協, in Part 3 of a treatise with the same title, *Li zhi pu* (1628), recommends propagating by cuttings, selecting the finest branches. He claims that, whatever Xu (Bo) may write in his treatise, he himself has never seen a single one of the grafts that he effected that survived.¹⁰⁰⁷ Another author, Wu Daiao 吳載鰲, in his *Ji li zhi* 記荔枝 (Notes on the Litchi),¹⁰⁰⁸ likewise recommends propagation by cuttings (*duo jie* 奪接). Wang Shimao 王世懋, in his *Xue pu za shu* 學圃雜疏 (Various Commentaries on Gardening) (1587) (Ming),¹⁰⁰⁹ states that it is possible to graft shrub peonies (*mu dan*) onto the roots of herbaceous peonies (*shao yao*). Gao Lian 高濂, in the chapter entitled ‘Mu dan hua pu’ 牡丹花譜 (Treatise on the Shrub Peony) of his voluminous collection of notes *Zun sheng ba jian* 遵生八箋 (Eight Disquisitions on the Art of Living [a Retired Life]) (1591), also considers that the root of a herbaceous peony (*shao yao*) can serve as stock for a shrub peony. He also mentions another procedure that consists in grafting a peony with double flowers onto one with single flowers, having half dug it up and applied to it a young stem half cut off from a peony with double flowers bearing between three and five flower buds. The two parts need to be tightly bound together with a length of hemp, surrounded by mud and then protected by two tiles, which can be removed in the spring at the time of blooming.¹⁰¹⁰ A little later, he notes in the *Ju pu* 菊譜 (Treatise on Chrysanthemums) that it is possible to graft chrysanthemums as one grafts trees, onto a root of artemisia (*an liu* 菴藷) or by using as stock a chrysanthemum stump bearing small flowers.¹⁰¹¹ Gao Lian also notes a method of obtaining large fruit from gourds by a procedure similar to the one that we have already encountered, but by tying three stems tightly together.¹⁰¹² The fourth of the *Mu dan ba shu* 牡丹八書 (Eight Books on Shrub Peonies) (c.1610) by Xue Fengxian 薛鳳翔 is devoted entirely to grafting.¹⁰¹³ This text advises grafting after the

¹⁰⁰⁵ *Indocalamus tessellatus* (Munro) Keng.

¹⁰⁰⁶ See anon. (1993a, p. 242).

¹⁰⁰⁷ Anon. (1993a, pp. 253–4).

¹⁰⁰⁸ Anon. (1993a, p. 259).

¹⁰⁰⁹ Anon. (1993a, p. 315).

¹⁰¹⁰ Gao Lian (1988, pp. 606–7).

¹⁰¹¹ Gao Lian (1988, p. 619).

¹⁰¹² Gao Lian (1988, p. 604).

¹⁰¹³ See Wu Qijun (1959, p. 656).

autumn solstice; he recommends two methods, with a single slit if the stock is not very thick or in a ring graft if it is able to carry several scions. It is worth noting the striking terminology used for the stock: it is called *qin mu ben* 親母本, ‘mother ancestor stump’ or simply ‘mother’, while the scions, once inserted into the ‘belly of the mother’ (*mu fu*), are the ‘embryos’ (*tai* 胎). The author adds that ever since the Long Qing period (1567–73) herbaceous peonies have been used as stock, but that after 1600, during the Wan Li period (1573–1620), it was noticed that better results could be obtained if one chose slips from common shrub peonies when grafting exceptional varieties.

Alongside these monographs, several great horticultural and agricultural works were completed under the Ming dynasty. Let us now consider the place occupied by the parts relating to grafting. Song Xu 宋琬, whose personal name was Jiufu 久夫, a native of Huating 華亭, to the south of present-day Shanghai,¹⁰¹⁴ who lived in the 15th century,¹⁰¹⁵ composed a *Zhu yu shan fang za bu* 竹嶼山房雜部 (Miscellanies from the Residence of the Zhu Yu Mountains) in twenty-two *juan*, three chapters of which (*juan* 9–11) concern the cultivation of plants. The section devoted to grafting begins with a citation in a note to the poem by Chen Guan 陳瓘.¹⁰¹⁶ The author goes on to specify the periods when grafting should be carried out – before the spring equinox or after the autumn equinox, depending on the periods when the tree is developing – and the way of proceeding, with a light touch, in order not to wound the tree, which may be one or two years old, and choosing for preference two-year-old scions that have already produced fruits. Finally he states that there are countless ways of grafting and describes two of them: *yao jie* ‘grafting on lumbar regions’, for trees with a wide trunk, and *gen jie*, ‘grafting onto the root’, for trees with a slender trunk. The former is a ring graft onto two opposite sides of an ‘anvil’ that is good and smooth after cutting into the trunk, using a saw with fine teeth at a height of seven or eight inches from ground level. It is necessary to break the bark, ‘the skin’, with a little ‘membrane’ (*mo* 膜), the cambium, which other authors call the ‘flesh’ (*rou* 肉). After narrowing one inch of the tip of the scion, it must be placed in one’s mouth ‘in order to warm it’, after one has abstained from strong-tasting food and all alcoholic drinks; one then inserts it ‘between the skin and the membrane’ and protects the graft with earth and broad leaves of bamboo (*ruo*). The procedure for a graft onto a root is similar except that one makes only one graft per plant and entirely surrounds the little stump with earth, allowing only the scion to peep out.

Given that Chen Shijiao 陳詩教 dates the preface of *Hua li huai* 花里話 to the *ping-chen* year of the Wan Li period (1616) and signs it as the author of the *Guan yuan shi* 灌園史, we may conclude that the latter book was earlier than 1616. The copy that I have consulted, in the Library of Congress in Washington, DC, has no preface and names two authors, the second being the painter and man of letters

¹⁰¹⁴ Cf Fang Binguan et al. (1933, p. 355).

¹⁰¹⁵ Cf Ye Jingyuan (2002, p. 33).

¹⁰¹⁶ See pp. 506–7 above.

Chen Jiru 陳繼儒 (1558–1639), who checked and corrected (*shan ding* 刪定), the texts that Chen Shijiao had compiled (*bianzhu* 編著). The third of the ten horticultural methods cited in the treatise is the *jie huan* 接換 graft. The fundamental principle in this case is compatibility. Then the height of the level at which the stock is cut is indicated: high up if the tree is tall, and close to the ground if it is not. Four types of graft are described: *dui jie* 對接, which is symmetrical; *ou jie* 偶接, which is asymmetrical; *cha jie* 插接, which is by insertion; and *he jie*, 合接 which is reciprocal. The first three are ring grafts, in which the incision into the stock in the first case is as deep at the top as at the bottom, and in the second case is oblique; in the third case the scion is inserted beneath the bark and in the fourth case the graft is a simple English one.

In the *Hua shi zuo bian* 花史左編 (preface 1617) by Wang Lu 王路, which is more of an aesthetic work than a technical horticultural one, there is mention of the *jie huan* graft in the calendar of agricultural activities in *juan* 5.

In the first month, the recommendation is to graft, preferably after rain, *hai tang*, *la mei*, the flowering varieties of pear tree, Japanese apricot trees, peach trees, apricot trees and plum trees, and also yellow rose plants. In the second month, the osmanthus (*mu xi* 木樨), the *hai tang*, the peach tree, the Japanese apricot tree, the apricot tree, the plum tree and the pear tree; the *zi ding xiang* 紫丁香, broad leaved lilacs, should be grafted around the time of the equinox. In the sixth month, one can graft cherry, peach and pear trees. In the seventh month, *hai tang*, *lin qin* and *xiao chun tao* 小春桃. Finally, the last grafts take place in the eighth month for the shrub peony, the *hai tang*, *xiao chun tao* and the Japanese apricot tree with a green calyx (*li e mei* 綠萼梅). The remaining few references concern the shrub peony and the pomegranate tree (*shi liu*); in the case of the latter, we are told, the scion from a white variety inserted into a stock with red flowers will produce pink flowers.¹⁰¹⁷ Where the shrub peony is concerned, the kind with single flowers is only recommended when grafted on (*shan dan* 山丹),¹⁰¹⁸ another mention of grafting¹⁰¹⁹ simply repeats what Gao Lian writes in the *Mu dan hua pu*, where he advises grafting fine varieties onto the roots of herbaceous peonies (*shao yao*) or fine double varieties onto the roots of plants with single blooms.

The next text in this inventory is the *Zhi pin* 植品 (The Appreciation of Plants) (preface 1617), by Zhao Han 趙涵. As we have seen,¹⁰²⁰ the author lived in what is now Shaanxi (Shenshi) and was not content just to admire plants but also cultivated them. His notes are therefore extremely precious and original as they testify not only to the aesthetic tastes of the author but also to his horticultural practices, even though his work is by no means a handbook. Zhao Han mentions grafting several times, always in a quite specific and concrete context, which proves that he was used to working as a practical horticulturalist. First he declares that he has successfully grafted shrub peonies, as was at that time done in Chang'an – that is to say, by

¹⁰¹⁷ *Juan* 4, 5a.¹⁰¹⁸ *Juan* 7, 3b. *Lilium concolor* Salisb.¹⁰¹⁹ *Juan* 7, 10a.¹⁰²⁰ See pp. 422–3 above.

inserting into a thick root of a shrub or herbaceous peony a fine scion with a bevelled tip. Next, he explains that the people of Henan use thick roots of artemisias (*hao* 蒿)¹⁰²¹ for grafting several chrysanthemum stems, and that this produces blooms that are ‘red, yellow, purple and white, all on the same plant’. He remarks that although people in his household are also capable of doing this, the result is not necessarily aesthetically satisfying. Since Japanese apricot trees (*mei*) do not grow naturally in his region, which, as regards *mei*,¹⁰²² produces only wintersweets (*la mei* 臘梅), he has the former brought from the south and grafts them onto peach and apricot trees. Likewise, in the case of magnolias (*yu lan* 玉蘭),¹⁰²³ which also come from southern regions, these are grafted onto plants of magnolia (*xin yi* 辛夷),¹⁰²⁴ for they have flowers that are whiter and more fragrant than those of the latter. On the subject of *hai tang* 海棠,¹⁰²⁵ he notes that *tie geng hai tang* 貼梗海棠,¹⁰²⁶ when grafted onto *mu gua* 木瓜,¹⁰²⁷ produces flowers of a vermilion red, which prompted him to apply to them the popular name *shan cha* 山茶, ‘camellia’, given that true camellias do not grow in this region. Finally, it is also thanks to grafting that three varieties of *jin ju* 金橘,¹⁰²⁸ kumquat, are able to grow in gardens, when grafted onto hardy orange trees (*zhi* 枳), but only to delight the eye, unlike in southern regions, where, he says, their fruits are much appreciated.

The unknown author of the *Jia pu ji* 稼圃輯 (Collection on Agriculture and Gardening) (later than 1587) draws attention to the advantages of grafting both fruit trees and mulberry trees. He also notes the customary directions concerning the choice of a scion ‘exposed to the south’, abstinence from alcohol and spicy foods when grafting and the fact that after three grafts fruit stones become smaller and can no longer be sown. The best date suggested for grafting is ten days prior to the spring equinox; however, it is also possible five days after it or else at the autumn equinox. The six ways of grafting that are then described are all taken from the *Nong shu* by Wang Zhen: ‘grafting on the body’ (*shen jie*), ‘grafting on the root’ (*gen jie*), ‘grafting on the skin’ (*pi jie*), ‘grafting on a shield on the trunk’, ‘grafting on a branch’ (*zhi jie*), ‘grafting on a shield on a branch’, ‘grafting with a “fly”’ (*ya jie*), and ‘grafting by joining’ (*da jie*). The vocabulary used is slightly different: as well as *jie* for grafting, we also find *jie tie* 接貼, ‘grafting–sticking’. The stock is called *yuan shu* 元樹, ‘original tree’; the cut surface is *pan* 盤, ‘plate’. On the subject of grafting onto a branch in a case where two trees have trunks that are close to each other, the text indicates the possibility of, instead, choosing the ‘method of bringing two trees together’ (*liang shu xiang jin zhi fa* 兩樹相近之法), which is no doubt a form of grafting by proximity. So in all seven methods of grafting are mentioned in this text, which, all put together, makes it the most important of all the texts considered so far.

¹⁰²¹ *Artemisia* sp. ¹⁰²² On the classification of plants according to their names, see pp. 52–3 above.

¹⁰²³ *Magnolia denudata* Desr. ¹⁰²⁴ *Magnolia liliflora* Desr.

¹⁰²⁵ Folk genus, including shrubs with abundant flowers that produce fruit resembling tiny apples, that groups together species of apple tree and quince.

¹⁰²⁶ *Chaenomeles speciosa* (Sweet) Nakai, in Yu Dejun (1982, p. 166).

¹⁰²⁷ *Chaenomeles sinensis* (Thouin) Koehne, in Yu Dejun (1982, p. 165).

¹⁰²⁸ *Fortunella margarita* (Lour.) Swingle, in Yu Dejun (1982, p. 300).

As we have noted earlier, the *Ru nan pu shi* 汝南圃史 (1620) by Zhou Wenhua 周文華 is basically a judicious compilation of several different texts. So all the information about grafting is essentially a repetition of earlier knowledge. The first to be cited are the *Yunzhai hua pu* 允齋花譜 (Yunzhai's Treatise on Flowers) and the *Guan yuan shi*, the contents of which are very similar. Next, there is a long citation from the *Jia pu qi shu* 稼圃奇書 (Book of the Secrets of the Cultivation of Small Gardens).¹⁰²⁹ Upon reading the cited passage, one is struck by the close resemblance to the text of the *Jia pu ji* 稼圃輯. However, there is one slight difference from what has been presented above, for out of the six methods listed there, only five are repeated here, for 'grafting with a "fly"' is not cited. The close similarity between the two titles is also curious.

In the *Er ru ting qun fang pu* 二如亭群芳譜 (1620) by Wang Xiangjin 王象晉, the initial chapter, *juan shou*, of the section devoted to fruit trees contains a chapter on grafting that, naturally enough, starts by praising the advantages of this operation called *jie bo* 接博.¹⁰³⁰ We find the by now familiar information concerning tools, the choice of scions, the positioning of the graft and the periods that are favourable for grafting. Six methods are listed and described, repeating the text of the *Nong shu* by Wang Zhen. What differs from the earlier texts and in particular from that of the *Jia pu qi [shu]* is that 'the method of mutual proximity between the two trees' (*liang shu xiang jin zhi fa*) mentioned in that last text here becomes the subject of a specific chapter entitled 'Guo tie' 過貼, 'Transmitting by Sticking Together', which refers to an approach to grafting which the author recommends when layering or classic grafting is not possible. He explains this term by *ji zhi* 寄枝, which can be translated as 'transmitting [a] branch', 'pressing [a] branch on'. It is apparently a matter of bringing close to another tree a young tree whose leaves and nature are compatible with the first tree and bringing into contact one branch from each of the trees, having partially cut away the bark and cambium (*pi* 皮 and *mo* 膜) and having bound them together with hemp bark covered over with mud. The tree to be grafted can be planted either in the earth or in a pot. Wang Xiangjin points out that one can, in this way, graft magnolias, camellias, flowering apple trees (*hai tang*), peach trees, plum trees, apricot trees and so on during the second and third months. It is worth pointing out that grafting by proximity, just like the spontaneous grafting known and named *mu lian li* ever since the Han period, appears in this text clearly, for the first time, as a grafting procedure; however, it is treated somewhat differently.¹⁰³¹ It is not included in the list of grafts and, from a lexical point of view, it is not actually called a 'graft' (*jie*, *jie bo*) but rather a 'sticking together' (*tie*). Perhaps this throws some doubt on the thesis that the idea of grafting was inspired in

¹⁰²⁹ This title does not appear in the bibliography established by Wang Yuhu (1979).

¹⁰³⁰ Pp. 322–47 in the later edition; see Fan Chuyu et al. (1994).

¹⁰³¹ Bretschneider (1880, p. 15) notes a particular use of grafting by proximity that he has observed: 'the Chinese produce artificially the tree known in Europe as *Sophora pendula*, in causing two young trees of *S. japonica* L. growing close together, to join by grafting, and then turning upwards the roots of one of them'.

the earliest agricultural workers who practised it by their observation of spontaneous grafts (*mu lian li*).

In the text of the *Pei hua ao jue lu* 培花奧決錄 (preface 1634),¹⁰³² published soon after, Sun Zhibo 孫知伯 returns to the six grafting methods of Wang Zhen's *Nong shu* without also mentioning grafting by proximity. At the end of the chapter, he declares that a peach tree can serve as stock for fruit trees of all types.

Now we come to the last treatise, published in 1639, just before the collapse of the Ming dynasty: the *Nong zheng quan shu* by Xu Guangqi (1562–1633). The interest of this work lies in the personality of its author, who had a curious and experimental mind. He often follows up the numerous citations that he makes with a number of remarks of his own. For example, on the subject of the kaki, after introducing a citation from the *Bian min tu zuan* 便民圖纂 (1502) by Kuang Fan 匡番,¹⁰³³ which states that after three grafts there are no more fruit stones, he expresses his astonishment as follows: 'There is no reason for over-grafting (*zai jie* 再接再) trees, a fortiori why three times?'¹⁰³⁴ He discusses grafting in *juan* 37, which is devoted to the general principles of plant cultivation. Again, the text of the *Nong sang ji yao*, which is devoted to the advantages of grafting and the equipment and care that are needed for it, is cited. And again the six methods described by that author are mentioned. They are followed by a long citation from the *Nong san ji yao* that has been cited above.¹⁰³⁵ Next comes a recapitulation of all the information relating to the choice of the scion and the stock and the need to choose plants that are compatible, which has likewise been discussed and translated above. Quite apart from the remark relating to over-grafting, the originality of this author also appears in his comments at the end of this section devoted to grafting:¹⁰³⁶

[To] graft trees, there are three secrets: the first [is] to protect the dark green parts (*chen qing* 襯青); the second is to conform to the *jiu jie* 就節 moment; and the third is to solder it firmly together (*dui feng* 對縫). If one does this, there will be no failure.

* * *

At the end of this overview of the grafting of plants in China up until the 17th century, a number of facts have become clear. For at least 2,300 years, grafting was a technique that was practised by Chinese peasants in order to improve the production of the fruit of not only trees but also gourds. In the case of ornamental plants such as peonies and chrysanthemums, it was under the Song dynasties that there developed an unprecedented enthusiasm for grafting in order to obtain particularly beautiful or astonishing blooms. Next, a first attempt at a synthetic presentation of the various practices was published with a view to popularising the procedure, in 1273, at the start of the Yuan dynasty. This was followed in 1333 by

¹⁰³² Qian ji, pp. 43b–47a. ¹⁰³³ Kuang Fan, Shi Shenghan and Kang Chengyi (1982).

¹⁰³⁴ Xu Guangqi (1979, p. 779). ¹⁰³⁵ See p. 516, 'Grafting all fruit trees'.

¹⁰³⁶ Xu Guangqi (1979, p. 1031).

Wang Zhen's book on agriculture, which listed the six methods that would be repeated in the works of the following centuries. We can see from all this that, by the 14th century, ring-grafting techniques, grafting in shield shapes and grafting onto trunks or branches were all known, as were English grafts and also the effects of different types of stock on the products of their scions, whether those products were leaves – in the case of mulberry trees – or fruit; and they were all noted down. The improvements obtained sometimes caused a fruit to be given a new name and to be considered a new variety. It is noticeable that the advice given was to multiply good varieties by grafting rather than by sowing the fruit-stones. The reasons given for this preference were the rapidity of the production of fruits from the scions and also the stability of the qualities of their products. Although unable to explain all this, the agriculturists of ancient China had certainly recognised the superiority of vegetative multiplication over sexual multiplication for the maintenance of the cultivars of the fruits and the flowers that they considered to be of particular interest.

(j) PLANTS AND BOTANICAL EXCHANGES

The Chinese Contribution to the Rest of the World

The title that Joseph Needham chose for this last section was ‘The influence of Chinese flora and botany on modern plant science’. The first section of this book has shown that it is hard to speak of ‘botany’ in the modern sense of the term in connection with the varied and abundant knowledge about plants that the ancient Chinese possessed. Furthermore, the rare translations of ancient Chinese texts relating to plants – even the important work by Bretschneider – were not concerned with botanical considerations of a theoretical nature. Up until the second half of the 19th century, at no point did even the notion of a specific domain devoted to the study of plant life, in other words ‘botany’, appear in China. In this respect, I consider that Chinese so-called ‘botany’ had nothing to contribute to modern science since it developed in an entirely different conceptual framework and, in any case, lacked any formalisation that might have made exchanges possible. In my study of the *Zhi wu ming shi tu kao* (1848) by Wu Qijun, rightly considered to be the ultimate outcome of that ‘botany’, I shall be showing in my conclusion that if one looks beyond formal appearances, one finds virtually nothing to relate this work to modern science; in fact, on the contrary, it is clear that it reflects a quite different approach to the study of the plant world. On the other hand, Chinese flora were of great interest to botanists, the more so because, over a very long period, the impossibility of engaging in local fieldwork had given rise to many fantasies. We shall be seeing how, progressively, the discovery of this wealth of knowledge about flora gave rise to considerable interest, once botanical explorations became possible in the course of the second half of the 19th century. In particular, ornamental plants enriched the diversity of European and American gardens to an extraordinary degree, but not until after the end of the period considered in the first two sections of the present volume. I shall eventually be noting the range of Western knowledge relating to Chinese flora, then the earliest arrivals of large numbers of Chinese plants in the gardens of Europe and North America, and finally the influence of Chinese gardens on Europe, down to the end of the 18th century. But first, I shall devote a section to a reminder of all the plants that China had been receiving from other neighbouring and distant lands ever since the Han dynasties. Then, I shall be noting the diffusion of Chinese knowledge relating to *materia medica*, laying particular emphasis on the role played by Li Shizhen’s *Ben cao gang mu*. This chapter will not claim to deal exhaustively with the relations between China and every other country in the world. In particular, I shall leave to others who are better informed than myself the matter of Chinese relations with Korea and Vietnam, a subject that presents extremely interesting avenues of research. The two cases upon which I, for my part, shall be concentrating present very different situations: first, the exchanges

between China and Japan, a country within the Chinese cultural area; then, the way in which the Far West progressively discovered Chinese flora.

(1) PLANT TRANSMISSIONS AND EXCHANGES
OF KNOWLEDGE

(i) *Plants introduced into China*

The earliest cultivated plants attested to have been introduced into China came from 'territories in the west', *xi yu* 西域. About a dozen plants are attributed to the activities of a Han Court official, Zhang Qian 張騫 (?–114 BC). In –139 he was sent by Emperor Wu Di (–141–87) as an emissary to the Yue Zhi to seek an alliance against the Xiong Nu. He was taken prisoner and kept in captivity for ten years, then escaped¹ and apparently returned with a number of useful plants. Li Shizhen, on the basis of various sources, attests in the *Ben cao gang mu* that he was responsible for the arrival in China of the ten or so following plants. The safflower (*hong lan hua* 紅蘭花 = *hong hua* 紅花)² he cites (*juan* 15, p. 966) in the 'grasses section' (*cao bu*), according to the *Bo wu zhi* by Zhang Hua (+232–300). In the 'grains section' (*gu bu*) (*juan* 22, p. 1435), according to the *Meng qi bi tan* by Shen Gua (+1031–1095), he cites sesame (*hu ma* 胡麻 = *you ma* 油麻),³ and according to the *Tai ping yu lan* (+983), the broad bean (*can dou* 蠶豆⁴ = *hu dou* 胡豆) (*juan* 24, p. 1519). In the 'vegetables section' (*cai bu*), according to the *Tang yun* 唐韻 (+751) by Sun Mian 孫愐, he mentions garlic (*hu* 葫 = *da suan* 大蒜)⁵ (*juan* 26, p. 1597) and, without providing any other further reference (*juan* 26, p. 1630),⁶ he credits Zhang Qian with the introduction of coriander (*hu sui* 胡荽)⁷ and also (*juan* 28, p. 1701) with that of the cucumber (*hu gua* 胡瓜⁸ = *huang gua* 黃瓜). Finally, he refers to the *Xi jing za ji* by Ge Hong (+284–364) for a mention of the alfalfa (*mu xu* 苜蓿) (*juan* 27, p. 1652).⁹ In the 'fruits section' (*guo bo*), again relying on the *Bo wu zhi*, he declares that Zhang Qian introduced the pomegranate tree (*an shu liu* 安石榴) (*juan* 30, p. 1782); citing Su Song (+1019–1101), the author of the *Tu jing ben cao*, he also attributes to him the walnut tree (*hu tao* 胡桃) (*juan* 30, p. 1803). However, on the subject of the introduction of the vine (*pu tao* 葡萄), he casts doubt upon the citation from the *Han shu* (History of the Han) that also credits Zhang Qian with it, for he points out that

¹ See Gernet (1990, p. 111). ² *Carthamus tinctorius* L. ³ *Sesamum indicum* L.

⁴ *Vicia faba* L. However, as Laufer (1919, p. 307) notes, the bean is attested in literature only much later, in the *Nong shu* by Wang Zhen. Li Fan (1984, p. 149) notes that Arabs claim that it was introduced in the Yuan period through Yunnan and Sichuan but, in view of the results of archaeological excavation, they thought that this vegetable may have been cultivated in China ever since the Neolithic period. However, following this hypothesis, it seems astonishing that there is no mention of the cultivation of beans in any texts earlier than the *Nong shu*. On the question of foreign plants that may have existed in China before their supposed introduction, see Métaillé (1992b).

⁵ *Allium sativum* L.

⁶ However, as Shi Shenghan points out (1963, p. 18), the plant is already cited in the *Qi min yao shu* in reference to the *Bo wu zhi*.

⁷ *Coriandrum sativum* L.

⁸ *Cucumis sativus* L.

⁹ *Medicago sativa* L.

the plant had already been mentioned in the *Shen nong ben cao'jing*, and so was known before the Han period (*juan* 33, p. 1885).¹⁰ However, the myth of Zhang Qian being the first provider of useful plants from Central Asia, already questioned by Berthold Laufer, who credited him only with the alfalfa and the vine,¹¹ is the subject of a remarkable analysis and deconstruction by Shih Shêng-han (Shi Shenghan), who devotes a study to a number of different sources.¹² Although he shows that, strictly speaking, Zhang Qian introduced nothing at all, he does emphasise the fact that he often mentioned remarkable plants and animals that he had seen in the regions that he visited. Shih Shêng-han points out, in particular, that both the *Shi ji* and the *Han shu* note that Zhang Qian told the Emperor Wu Di of those discoveries of his. We also learn from these two works that subsequently emissaries were despatched to regions in the west to search for seeds. The fact that Zhang Qian was the first to open up a passage to the west and the first to bring back news of the existence of new and potentially interesting cultivated plants no doubt explains how it was that he was later credited with all those early introductions. Among those plants, one of the most important from a strategic point of view was the alfalfa, which, having arrived in the course of the 2nd century BC, along with horses from Ferghana, led to improvements to the imperial armies' cavalry.¹³ So before becoming a vegetable, it was initially cultivated in China as fodder.

Li Shizhen also tells us, without referring to Zhang Qian, that the pea (*wan dou* 豌豆,¹⁴ another synonym for *hu dou* 胡豆) also came from the West. The most ancient mentions of the hyacinth bean (*bian dou* 扁豆),¹⁵ which originated in India or Indonesia, appear in the *Ming yi bie lu*, attributed to Tao Hongjing (+456–536), and in the *Xin xiu ben cao* (c.+650) by Su Jing. The watermelon (*xi gua* 西瓜),¹⁶ which originated in the semi-desert zones of southern Africa,¹⁷ seems to have arrived in China during the Five Dynasties period (+907–60), to judge by the notes made by a certain Hu Jiao 胡嶠, who lived in that period and who states in the *Xian bei ji* 陷北記 that he has brought back seeds from a gourd that produces very large fruits and that he has named *xi gua*, 'gourd of the West'.¹⁸ The musk melon (*tian gua* 甜瓜)¹⁹ originated in the sub-Saharan tropical zones of eastern Africa and possibly also grew in India.²⁰ It may have come to China by way of the Gansu or Xinjiang regions. Li Shizhen chooses as its principal name *tian gua*, as given in the *Tu jing ben cao* 圖經本草 (+1062) by Su Song 蘇頌, but as a synonym he cites *gan gua* 甘瓜, which is given in the *Xin xiu ben cao* 新修本草 (c.+659) by Su Jing 蘇敬, which suggests that it may have been introduced at the latest at the start of the 7th century. Dark or light green chards are already mentioned by Theophrastus in Greece in the

¹⁰ This remark suggests that Li Shizhen thought that the mythical emperor Shen Nong was the author of this text, which is today 'considered unmistakably a Han work' (SCC Volume 6, Part 1, p. 243).

¹¹ Cf Laufer (1919, p. 190).

¹² Cf Shi Shenghan (1963).

¹³ Cf Gernet (1990, p. 128).

¹⁴ *Pisum sativum* L.; Li Jiawen (1981, p. 91), Li Fan (1984, 148).

¹⁵ *Dolichos lablab* L.; cf Li Jiawen (1981, p. 91), Li Fan (1984, p. 152).

¹⁶ *Citrullus lanatus* (Thunb.) Mansfeld = *Citrullus vulgaris* Schrad.

¹⁷ Whitaker and Bemis (1976, p. 67).

¹⁸ Wu Gengmin (1957, p. 401).

¹⁹ *Cucumis melo* L.

²⁰ Whitaker and Bemis (1976, p. 67).

4th century BC.²¹ The name *tian cai* 蒹菜²² appears in China in the *Ming yi bie lu* among middle-grade products (*zhong pin* 中品); it is then also cited in the *Xin xiu ben cao*, in the vegetable section (*cai bu*); one interesting indication that supports a foreign origin for chards in China is the name *jun ta* 蓴, mentioned as a synonym in the *Ben cao gang mu* (vegetables section, *juan* 27, p. 1646), a term whose origin Li Shizhen claims not to know. Laufer tells us that the term is in fact a phonetic transcription of a Persian word for chard.²³ The fact that in the *You yang za zu* by Duan Chengshi the leaves of a plant *you dian cao* 油點草 are compared to those of chard (*jun ta*) leads Laufer to deduce approximately that 'the plant was well known in the latter half of the ninth century'. On the other hand, the precise date of the introduction of spinach (*bo cai* 菠菜,²⁴ also known as *bo leng* 波棱)²⁵ is known. A text in the *Tang hui yao* 唐會要,²⁶ by Wang Pu 王溥, runs as follows:

At the time of the Emperor Tai Zong [+627–49], in the twenty-first year of the Zhen Guan period [+647], Ni-pho-lo [Nepal] sent to the Court the vegetable *bo leng* 波棱, resembling the flower of the *hong lan* 紅藍 [*Carthamus tinctorius*], the fruit being like that of the *chi-li* [ji li] 蒺藜 (*Tribulus terrestris*). Well cooked, it makes good eating, and is savoury.

Laufer suggests that spinach must have been introduced recently into Nepal from some Iranian region.²⁷ The lettuce (*wo ju* 萵苣)²⁸ poses a particular problem. Its cultivation is attested ever since 4500 BC in Egypt,²⁹ whence it spread throughout the Mediterranean region. It appears initially to have been cultivated in order to extract an edible oil from its seeds. Then it became a vegetable the leaves of which were much used by the Greeks and the Romans. But in China it was above all sought after for its stalk, and one particular form of it, the stem lettuce or asparagus lettuce (*wo sun* 萵筍 or *wo ju sun* 萵苣筍), was – and still is – cultivated for its thick, crisp stem, which has a very delicate taste.³⁰ The leaf lettuce is generally known as *sheng cai* 生菜 and is eaten much less. The asparagus lettuce, on the other hand, 'cultivated in China ever since Antiquity',³¹ is the product of its selection from various spontaneous forms of the plant.³² However, the late appearance of the name *wo ju*, of which there is no mention before the Sui dynasty (+581–618) and the claim made in the *Qing yi lu* 清異錄 (c.+965) by Tao Gu 陶穀 to the effect that it came from the Land of Wo (Wo-guo 吳國), which is repeated later by Peng Cheng 彭乘 in the *Mo ke hui xi* 墨客揮犀 (c.+1080), which Li Shizhen cites, could also support the idea that it was introduced from elsewhere, as is claimed by Li Jiawen, who says it originated in Afghanistan.³³ The first of the above texts declares that

²¹ Campbell (1976, p. 25). ²² *Beta vulgaris* L. var. *cicla* L.

²³ Laufer (1919, p. 399) 'The Chinese transcription made in the Tang period is apparently based on Middle Persian form of the type *gundar or *gundur'.

²⁴ *Spinacia oleracea* L. ²⁵ The variant graphic 菠薐 is also to be found.

²⁶ Cited by Laufer (1919, p. 393), whose translation is used here. ²⁷ Laufer (1919, p. 398).

²⁸ *Lactuca sativa* L. ²⁹ Ryder and Whitaker (1976, p. 39).

³⁰ *Lactuca sativa* L. var. *angustana* Bailey; the first of the two names is in Hu Shiu-ying (2005, p. 740), the other in Wu Gengmin (1957, p. 273).

³¹ Wu Gengmin (1957, p. 273). ³² Li Fan (1984, p. 119). ³³ Li Jiawen (1981, p. 91).

under the Sui dynasty, emissaries from the Land of Wo came to the Han with seeds that the latter had requested. The emissaries were richly rewarded, hence the name *qian jin cai* 千金菜 [vegetable of one thousand gold pieces] given to what is today the lettuce (*wo ju*).

What is called 'the Land of Wo' is not actually identified and the fact that the *Ben cao shi yi* 本草拾遺 (c. +725) by Chen Cangqi 陳藏器, cited by Li Shizhen,³⁴ already mentions the existence of two forms, one with white leaves, the other with purple ones, both of which are still to be found today,³⁵ seems to me to support the hypothesis of an ancient local domestication rather than the plant's introduction from elsewhere. Whatever the case may be, the asparagus lettuce was well known under the Tang, and Du Fu (712–70) himself composed a poem entitled 'Zhong wo ju' 種萵苣, 'Cultivating the Lettuce'.³⁶ The importance of the mallow, used as the main leafy vegetable over a long period, which is attested by a number of texts, seems to testify obliquely to an absence of more interesting alternative vegetables with mucilaginous leaves. It does, indeed, appear that it was in the course of the Northern and Southern Dynasties (+420–589) that there arrived in China a species of cabbage (*Brassica* sp.) that gave rise to various cultivars of *jie lan* 芥藍, Chinese kale, and of *qiu jing gan lan* 球莖甘藍, kohlrabi,³⁷ with China becoming a secondary centre of its domestication.³⁸ Chinese kale³⁹ seems to have originated in the south of Guangdong province, while the region where kohlrabi became a major crop was the north-west. However, when formulating this hypothesis, in the second case Ye Jingyuan does not exclude the possibility of its coming from elsewhere,⁴⁰ although he does note that no ancient document attests this. The *jie qiu gan lan* 結球甘藍⁴¹ cabbage is without doubt of foreign origin and was introduced in a number of different regions. The most ancient attestation appears in the *Dali fu zhi* 大理府志 (Local Gazetteer of Dali) in the province of Yunnan for the forty-second year of the Jia Jing reign (1563). The cultivation of the cabbage, which probably originated in Burma, remained local. In the late 17th century, cabbages also arrived in Heilongjiang from Russia. Xinjiang is a third region where the cultivation of cabbages is recorded in the early 19th century.⁴² Finally, in the second half of the 18th century, local monographs in Taiwan (1747) and Fuzhou (1763) record the presence of cultivated cabbages imported by sea. As for the *hua ye cai* 花椰菜,⁴³ cauliflower, it was apparently sown for the first time in Pudong, Shanghai, in 1882.⁴⁴ According to Vavilov, the centre of the origin of the onion (*yang cong* 洋蔥),⁴⁵ 'scallion of the west', was Central Asia, with the Near East constituting a secondary centre.⁴⁶ The date of its introduction into China is not known, but the most ancient localities of

³⁴ Li Shizhen (1975–81, Volume 3, p. 1661). ³⁵ Hu Shiu-ying (2005, p. 740).

³⁶ Luo Zhufeng (1986–94, Volume 9, p. 442). ³⁷ *Brassica caulorapa* Pasq.

³⁸ This is the hypothesis formulated by Ye Jingyuan (1986, p. 250).

³⁹ *Brassica algolabra* Bailey (= *B. oleracea* L. var. *alboglabra* Bailey).

⁴⁰ It is generally accepted that the centre of origin is the Mediterranean region; see Thompson (1976, pp. 49–50).

⁴¹ *Brassica oleracea* L. var. *capitata* L. ⁴² Cf Ye Jingyuan (1986, p. 253).

⁴³ *Brassica oleracea* L. var. *botrytis* L. ⁴⁴ Cf Ye Jingyuan (1986, pp. 254–5).

⁴⁵ *Allium cepa* L. ⁴⁶ Cited by McCollum (1976, p. 186).

cultivation, 'which do not have a long history',⁴⁷ were in Xinjiang. Fennel (*hui xiang* 茴香), 'which is an introduced plant',⁴⁸ is mentioned for the first time in the *Xin xiu ben cao* in the section on grade-two grasses, part two, 草部中品之下, under the name *huai xiang zi* 懷香子. In the *Zheng lei ben cao*, we are told in a citation from the *Tu jing ben cao* that another name for it is *hui xiang* 茴香 and that its provenance is not known. In the *Ben cao gang mu*, Li Shizhen moves fennel from the 'grasses' category and places it in the 'vegetables' category, thereby no doubt indicating that it is used as a food. However, he tells us nothing about the origin of this cultivated plant. Li Jiawen suggests that it arrived in China during the two Han dynasties (–206–+220),⁴⁹ which seems unlikely to me, but the history of this plant that is both a foodstuff and medicinal is not addressed by any other authors.⁵⁰ Another imported vegetable is white mustard (*bai jie* 白芥).⁵¹ Li Shizhen (*juan* 26, p. 1609) states that it comes from the 'Rong Barbarians' (Hu Rong 胡戎),⁵² and that it was introduced into Sichuan, which provided the two synonyms that he cites, *hu jie* 胡芥 and *shu jie* 蜀芥. Although he provides no information as to the period when this vegetable was introduced, the reference to Chen Cangqi, which notes that 'it grows in Taiyuan and in Hedong',⁵³ indicates that it was cultivated in Shanxi before +739, while the mention in the *Shu ben cao* 蜀本草⁵⁴ of one of its synonyms makes it possible to confirm that if this mustard was indeed cultivated in Sichuan at the latest at the beginning of the 10th century, then it had arrived there not from abroad but from northern China, where it had been introduced over 200 years earlier. All authors⁵⁵ are in agreement with what Li Shizhen reports on the subject of the carrot (*hu luo bo* 胡蘿蔔).⁵⁶ It was during the Yuan dynasty (1280–1368), at the end of the 13th century,⁵⁷ that it arrived from the 'lands of the Barbarians' (*Hu di* 胡地), probably Afghanistan, which seems to be the first centre of its origin.⁵⁸ Wu Qijun, in the *Zhi wu ming shi tu kao* (1848), notes that it first became established in Yunnan.⁵⁹ The dating for other vegetables introduced from elsewhere is even less precise. According to Li Shizhen (*juan* 28, p. 1702), who is the first to incorporate the plant sponge (*si gua* 絲瓜)⁶⁰ into *materia medica*, this sponge 'originally came from the south, hence its name, "gourd of the Man people" *Man gua* 蠻瓜'. Spontaneous forms of these gourds are to be found on the plateaux of Yunnan and Guizhou and also along the frontiers of Burma and Thailand, as well as in Sri Lanka. The

⁴⁷ Li Fan (1984, p. 135).

⁴⁸ Hu Shiu-ying (2005, p. 597) gives no details to support this statement.

⁴⁹ Li Fan (1984, p. 91).

⁵⁰ Herklots (1972), Laufer (1919), Li Fan (1984), Lin Ruoxiu (1958), Schafer (1963), Wu Gengmin (1957).

⁵¹ *Sinapis alba* L. ⁵² Non-Han populations, living in the north-west.

⁵³ To the east of the (Yellow) River.

⁵⁴ This book, today lost, was the product of the compilation expanded by the addition of the *Xin xiu ben cao* and the *Tu jing ben cao* and it was completed under the direction of Han Baosheng 韓保昇 in 934 (see Guo Aichun 1977, p. 68). Another title is *Chong guang ying gong ben cao* 重廣英公本草 (see Ma Jixing et al., 1981, p. 182).

⁵⁵ Wu Gengmin (1957, p. 41); Lin Ruoxiu (1958, p. 37); Li Fan (1984, p. 120); Laufer (1919, p. 451).

⁵⁶ *Daucus carota* L. ⁵⁷ Cf Lin Ruoxiu (1958, p. 37). ⁵⁸ Banga (1976, p. 292), citing Mackevic.

⁵⁹ Cf Lin Ruoxiu (1958, p. 37).

⁶⁰ The term *si gua* is a generic designating two distinct species *Luffa cylindrica* (L.) Roem. and *Luffa acutangula* Roxb.

introduction of cultivated forms originating in India occurred during the Yuan period (1271–1368).⁶¹

Certain spices are for the first time mentioned in pharmacopoeia under the Tang dynasty. One is pepper (*hu jiao* 胡椒),⁶² which, according to the *You yang za zu*, came from Magadha.⁶³ Li Shizhen reports that it is cultivated all over Hainan and also in southern Yunnan.⁶⁴ Another pepper, long pepper (*bi bo* 萆撥),⁶⁵ used in pharmacopoeia under the Tang but at that time imported, is mentioned under the Song, in the *Tu jing ben cao*, which reports that it is cultivated in Lingnan.⁶⁶

Among the grains, sorghum or *gao liang* 高粱⁶⁷ is an African domesticate that is also known as *shu shu* 蜀黍, 'Sichuan millet'.⁶⁸ The date of its introduction in China is uncertain.⁶⁹ Wang Yuhu and Amano Motonosuke, for example, consider that it was already being cultivated in northern China in the early 10th century.⁷⁰ Ho Ping-Ti says that an early description of it is to be found in the 1175 edition of the *Xin an zhi* 新安志 by Luo Yuan 羅願, a local monograph on the history of Huizhou prefecture in southern Anhui.⁷¹ Hagerty believes that the earliest unambiguous references to sorghum are to be found in Yuan texts.⁷² 'Be that as it may, whenever sorghum was introduced into China proper, we can be certain that it was reasonably familiar to Yuan and Ming writers'.⁷³ Another important introduction was that of rice types from Champa, a state in southern Annam, which were non-sticky (*xian* 籼, 粳, 秈). These were interesting given the precocity of most varieties. They spread progressively northward during the medieval period up until +1012, when the Song Emperor Zhen Zong decided to popularise their cultivation in south-eastern China by having their seed distributed there by government officials. This was an immediate success and by the end of the century 80–90 per cent of the irrigated rice grown in the lower Yangzi was of the Champa type.⁷⁴

The almond tree, the centre of whose origin stretched from Central Asia to western Asia,⁷⁵ was described in a Chinese text for the first time by Duan Chengshi, who named it *pian tao* 偏桃, 'oblique peach'.⁷⁶ Although this author states that it comes from Persia, he does not claim that it is cultivated in China. As we have seen, Li Shizhen considers it to be a kind of apricot tree, which he calls *ba dan xing* 巴旦杏, 'ba dan apricot tree', in which the name *ba dan* is a phonetic transcription of the

⁶¹ See Wu Gengmin (1957, p. 412), Smith (1976, p. 306), Li Fan (1984, p. 144). On the use made of it, see Porterfield (1943).

⁶² *Piper nigrum* L. ⁶³ Duan (1981, p. 179, no 795).

⁶⁴ He classifies it in the fruit section, in the 'tasty' category, *wei lei* 味類. See Li Shizhen (1975–81, Volume 3, p. 1858).

⁶⁵ *Piper longum* L.

⁶⁶ See Su Song cited by Li Shizhen (1975–81), *juan* 14, grasses section, category of fragrant grasses, *fang cao* 芳草, Volume 2, p. 872.

⁶⁷ *Sorghum vulgare* Pers. ⁶⁸ Bray, *SCC* Volume 6, Part IV, p. 449.

⁶⁹ On this point, I am following the study by Francesca Bray, in *SCC* Volume 6, Part IV, pp. 449–52.

⁷⁰ Amano (1979, p. 22), Wang Yuhu (1980, pp. 12–13). Cited in Bray, *SCC* Volume 6, Part IV, p. 451.

⁷¹ Ho Ping-Ti (1975), p. 382. Cited by Bray, *SCC* Volume 6, Part IV, p. 451.

⁷² Hagerty (1941), cited by Bray in *SCC* Volume 6, Part II, p. 449, note g. ⁷³ *SCC* Volume 6, Part II, p. 451.

⁷⁴ *SCC* Volume 6, Part II, p. 492. ⁷⁵ Watkins (1976, p. 245). ⁷⁶ Duan Chengshi (1981, p. 178, no 792).

Persian term *bā-dām*, which denotes an almond tree.⁷⁷ He reports that it is cultivated in the north-west. However, its cultivation does not appear to have spread very much, for mentions of it in texts of the Qing period, the *Hua jing* (1688), the *Guangdong xin yu* (1690) and the *Zhi wu ming shi tu kao* (1848),⁷⁸ for example, only allude to it in passing, and even today it is only in regions of Xinjiang, Gansu and Shaanxi (Shensi) that it is cultivated, and then only very little, if at all.⁷⁹ Certain other trees were introduced with the advent of Buddhism. One was the sal tree (*suo luo shuang shu* 娑羅雙樹),⁸⁰ in a copse of which trees Gautama entered into Nirvana, which was noticed in a temple in Hunan by a foreign monk sometime before the 5th century. In the course of the reign of Xuan Zong in the Tang period (+712–55), several hundred cuttings are believed to have been sent to Changan from Ferghana.⁸¹ The banyan/peepul tree (*pu ti shu* 菩提樹)⁸² was introduced into China before the Tang period;⁸³ subsequently, two young plants were sent from India, one by an Indian king to the Tang Emperor Tai Zong in +641 and another that arrived in +647.⁸⁴ Trees with edible or medicinal fruits, as well as the pomegranate trees and walnut trees mentioned above, such as date palms (*hai zao* 海棗 and *bo si zao* 波斯棗)⁸⁵ (Persian jujube trees) were growing in Canton in the 9th century.⁸⁶ Myrobalans (*he li le* 訶梨勒),⁸⁷ from India, were appearing in pharmacopoeia as early as the Tang period. According to the *Xin xiu ben cao*, the emblic (*an mo le* 庵抹了),⁸⁸ which originated in Persia, was growing in Lingnan, Guangzhou, Jiaozhou and Aizhou,⁸⁹ while, according to the same source, myrobalans were also to be found in the last two of those localities. Four centuries later, it is clear that both of those trees were well established in China: Su Song records that the former was cultivated throughout the commanderies of Guangxi and Guangdong and also in the mountain valleys of western Sichuan,⁹⁰ and he also noted that the latter was cultivated throughout Lingnan but was particularly abundant around Guangzhou (Canton).⁹¹

Among the identified plants offered in 647 as tribute to the emperor, Edward H. Schafer notes that emissaries from Kashmir offered flowers known as *nila-utpala*, 'blue lotus',⁹² of a deep blue colour and extremely fragrant, and the neighbouring kingdom of Kapisa offered *kamuda*, bearing white and red flowers and also very fragrant.⁹³ But even if such species of water lily were introduced into the imperial gardens at that time, none of them are mentioned today either among floras or in

⁷⁷ Laufer (1919, p. 406).

⁸⁰ *Shorea robusta* Gaertn.

⁸³ Schafer (1963, p. 123).

⁸⁶ Laufer (1919, pp. 386–987); Schafer (1963, p. 122).

⁸⁷ *Terminalia chebula* Retz. It is classed in the category of trees, lower rank *mu bu xia pin*, although considered to be non-toxic. See Su Jing (1981, no 429, p. 358).

⁸⁸ *Phyllanthus emblica* L. It is classed in the category of trees, intermediary rank *mu bu zhong pin*. See Su Jing (1981, no 393, p. 339).

⁸⁹ Jiaozhou is present-day Hanoi and Aizhou, Thanh-Hoa in northern Vietnam.

⁹⁰ Cited by Li Shizhen (1975–81, Volume 3, p. 1824).

⁹² *Nymphaea caerulea* Savigny; see Schafer (1963, p. 131).

⁹³ Schafer (1963, p. 131) thinks that this is also a species of water lily, *Nymphaea esculenta* or else *N. alba*.

⁷⁸ Cf Ye Jingyuan (2002, pp. 359–60).

⁸¹ Schafer (1963, pp. 123–4); see in particular note 47.

⁸⁴ See Schafer (1963, p. 122, nn. 36, 37).

⁷⁹ Yu Dejun (1982, p. 35).

⁸² *Ficus religiosa* L.

⁸⁵ *Phoenix dactylifera* L.

horticultural encyclopaedias. Duan Chengshi, in his *You yang za zu*, does, however, describe a plant named *nai qi* 柰祇, originally from Fulin, the Eastern Roman Empire of Byzantium:

three or four feet tall, with a root as large as a duck's egg and leaves that resemble those of garlic. From the midst of the leaves a long stem rises, at the top of which is a flower with six red-white petals and a yellow-orange heart that bears no fruit. It grows in winter and dies in the summer, as does buckwheat or barley or wheat. The flowers are pressed in order to obtain an oil for the body, used to prevent colds . . .⁹⁴

As Li Shizhen cites this text, he wonders whether this plant might be a narcissus (*shui xian* 水仙).⁹⁵ Laufer, who agrees with him, writes as follows: 'The philological evidence agrees with this explanation; for *nai-qi*, **nai-gi* apparently answers to Middle Persian **nargi*, New Persian *nargis* (Arabic *narjis*) . . . denoting *Narcissus tazetta* which is still cultivated in Persia and employed in the pharmacopoeia'. This species of narcissus may perhaps have been introduced from Persia, but the plant cultivated in China, already attested by a picture by Zhao Mengjian 趙孟堅 (1199–1267)⁹⁶ (see Fig. 171) is a variety of it, *Narcissus tazetta* L. var. *chinensis* Roem., originally from the provinces of Zhejiang and Fujian.⁹⁷

The last foreign plants to arrive in China in the period under consideration came from America. Maize is called *yu mai* 御麥 in 1573 in the *Liu qing ri zha* 留青日札 by Tian Yiheng 田藝衡,⁹⁸ who records that the cultivation of this plant, 'a truly bizarre cereal', which comes from the Xi Fan, 西番, the foreigners from the west, is well developed in his own region, Zhejiang. A little later, Li Shizhen, who names maize *yu shu shu* 玉蜀黍, with the synonym *yu gao liang* 玉高粱, explains that it comes from 'lands in the west' and is not much cultivated. It is interesting to note that he describes a sticky form which, when roasted, 'opens up like a white flower'.⁹⁹ Other mentions of maize, naming it *fan mai* 番麥 or *xi-fan mai*, 'wheat from the aborigines of the west', appear in local Zhejiang monographs dating from the last years of the Ming dynasty and the early years of the Qing. In 1639 maize cultivation was even noted in Jiangsu. From the Wan Li period (1573–1620) down to the end of the Ming, the cultivation of maize was thus widespread in the lower Yangzi region.¹⁰⁰ On the strength of the fact that all the texts that he has consulted are in agreement on the point, Cao Shuji shows convincingly that maize arrived in China via overland routes from regions in Central Asia, rather than by sea.¹⁰¹ It was likewise during the Wan Li period that Zhao Han, in his *Zhi pin* (1617 preface) mentioned the arrival of the tomato and the sunflower, the seeds of which were bought by officials at the frontiers of the empire from foreign monks and were then

⁹⁴ Duan Chengshi (1981, p. 180, no 802). ⁹⁵ *Narcissus tazetta* L.

⁹⁶ I salute the memory of D. O. Wijnands, who drew this picture to my attention in 1990.

⁹⁷ See anon. (1972–6, Volume 5, p. 553). ⁹⁸ See Hu Xiwen (1959, p. 557).

⁹⁹ Does this detail not suggest that 'popcorn' should be added to the list of Chinese inventions?

¹⁰⁰ As we shall soon see, this fact is corroborated in the writings of foreign missionaries.

¹⁰¹ See Cao Shuji (1988, p. 64). The whole article is a very interesting analysis of the various hypotheses concerning the introduction into China of not only maize but also the sweet potato.

brought to the capital, where the emperor had them sown and then had plants from the seeds multiplied before diffusing the seeds further afield, after naming tomatoes *xi hong shi* 西紅柿, 'red kaki from the west' and giving sunflowers the name *xiang ri ju* 向日葵, 'chrysanthemum-that-turns-to-the-sun'. Zhao Han notes that between 1606 and 1607, the sunflower became very popular in Shaanxi (Shensi) province but that cultivation was soon abandoned due to the ugliness of the inflorescence once it had dried. Tomatoes, which were no doubt sown during the same period, were also soon abandoned because of what was considered to be the unpleasant smell of their stems and leaves. The story of the arrival of the sweet potato, *fan shu* 番薯, 'the yam of the barbarians of the west', is a complex one. On the strength of various local monographs, Ho Ping-ti arrived at the conclusion that it was presented to the governor of Fujian in 1594, a year when the harvest was bad, by the son of a merchant who was a native of the province, who had brought it back from Lusong, in the Philippines, and had cultivated it in Changluo county, close to Fuzhou.¹⁰² Another possibility that he envisages is its arrival at an earlier date through the port of Zhangzhou, where its introduction remained a secret until it had progressively been cultivated throughout the prefecture of Fuzhou. As well as cultivation in these coastal regions, the author reports, after reading monographs from Yunnan, that the sweet potato, known as *hong yu* 紅芋 (red taro), was cultivated in the prefecture of Dali, close to Burma, in 1563 and, in 1574, the History of Yunnan, *Yunnan tong zhi* 雲南通志, indicates that the sweet potato was cultivated in one prefecture and two counties. The author interprets these facts as proof that the sweet potato was probably introduced from India and Burma. Another article, produced by Liang Jiamian and Qi Jingwen, throws light on what happened in the Canton region.¹⁰³ The sweet potato was first introduced there sometime before 1582, in Dianbai, in the form of tubers brought overland from Vietnam; then, in 1582, it was brought by sea to Dongguan, to the east of Canton. We know that pumpkins, *nan gua* 南瓜,¹⁰⁴ which 'have been associated with man in the Americas for at least 10,000 years',¹⁰⁵ arrived in China before 1578, for Li Shizhen, who cites them, finished writing his *Ben cao gang mu* in that year. Although they were introduced into China relatively recently, their importance as a foodstuff is shown by the synonym *fan gua* 飯瓜, 'gourd – cooked grain', 'because of their use as a substitute for grain during famines', and also by the large number of known cultivars.¹⁰⁶ As for the groundnut/peanut (*luo hua sheng* 落花生) (Fig. 179),¹⁰⁷ the article by Ho Ping-ti constitutes a critical marker in relation to two classic articles by Laufer and Goodrich,¹⁰⁸ who dated the arrival of this plant to 1608. Ho Ping-ti cites the *Yu jing* 芋經 (Classic on Taros), in which we find the first description of the groundnut in any Chinese text.¹⁰⁹ The author of this text, Huang Xingzeng 黃省曾, lived from

¹⁰² Ho Ping-Ti (1955, pp. 193–4). ¹⁰³ Cf Liang Jiamian and Qi Jingwen (1980, 1981).

¹⁰⁴ *Cucurbita maxima* Duch.; *C. pebo* L.; *C. Moschata* Duch. ¹⁰⁵ Whitaker and Bemis (1976, p. 67).

¹⁰⁶ Yang and Walters (1992, p. 358).

¹⁰⁷ *Arachis hypogea* L.

¹⁰⁸ Laufer (1906–7b); Goodrich (1936–7).

¹⁰⁹ Ho Ping-ti (1955, pp. 191–2).

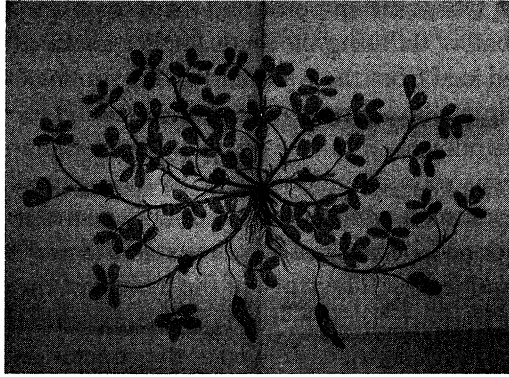


Fig. 179. Groundnut/peanut. An illustration sent by Father d'Incarville to Bernard de Jussieu with the name *lo hua seng* (*luo hua sheng*). Held in the collection of the Bibliothèque de botanique; no call number available.

1490 to 1540, so, in the absence of any precise date for the publication of his text, it is possible to confirm that, in the lower Yangzi valley, the groundnut was known by the first third of the 16th century, at the latest. The generic terms for the various cultivars of this species are *da hua sheng* 大花生, 'large groundnut', or *yang hua sheng* 洋花生, 'western groundnut'. They are characterised by the large size of the seeds, as opposed to another major group, formed of cultivars with small seeds, the *xiao hua sheng* 小花生, 'small groundnut', also called *Zhong-guo hua sheng* 中國花生, 'Chinese groundnut'. Although there is a general consensus in China on the foreign origin of the former group, some authors consider that the latter prove the existence of cultivation in China long before the arrival of the cultivars from America,¹¹⁰ while others go so far as to deny any introduction from elsewhere.¹¹¹ Nevertheless, for others, the cultivars with small seeds do correspond to early introductions, while the other types are far more recent introductions that occurred during the 19th century (which does seem more likely).¹¹²

As we can see, the phenomenon of introduction does not follow a single model. In some cases, as with the successors of Zhang Qian, it was Chinese emissaries who went off to find seeds outside China; sometimes it was a matter of private initiatives inspired by altruism, as in the case of the sweet potato; also, visits by envoys from tributary kingdoms frequently enriched the imperial gardens with new plants, as we are told and have seen above in the first part of the *Xi jing za ji* 西京雜記 (Miscellanies on the Western Capital) by Ge Hong (+283–364):¹¹³ 'At the start of the construction of the imperial park, crowds of high-ranking figures came from

¹¹⁰ Li Fan (1984, pp. 87–9). ¹¹¹ Wang Zaixu, Mao Xingwen and Yu Shanxin (1987, p. 65).

¹¹² Tang Qiyu (1986, p. 355). The claim that peanuts had existed in China ever since antiquity is based on the reports of archaeological excavations carried out in the Longshanoid sites of Zhejiang and Jiangxi. Chang Kuang Chih (1977, pp. 27–8), who records this information and also the scepticism of certain authors on this subject, goes on to remark that 'after their reported Lungshanoid occurrence, peanuts disappeared from known Chinese texts until the 16th century'.

¹¹³ See above, p. 448–9, in the chapter entitled 'Gardens'.

distant regions to present remarkable fruit trees and other exotic trees'. In this connection, one is bound to wonder in what form these trees arrived. It seems unlikely that official envoys bringing tribute simply presented the emperor with seeds, explaining that they would grow into future trees. One well-known picture of a figure carrying a pot in which a tree is planted surely indicates one of the means used to transport species of tree over long distances. All the imperial gardeners then had to do was replant the trees in the earth or, in the case of the more fragile species, transplant them into larger containers in order to be able to shelter them indoors in inclement weather.

At the end of this list of imported plants, it is clear in particular that a by no means negligible number of edible plants was added to the already large number cultivated locally, for we should remember that China was considered to be one of the principal centres for the domestication of cultivated plants.¹¹⁴ One remarkable feature, if we compare the situation in China to that in Europe, is the absorption of these new products into the ancient Chinese stock of plants without, however, causing the ancient cultivated plants to be forgotten. Even the mallow, one of the most notable vegetables in Chinese antiquity, was not altogether abandoned in favour of various more recent leafy vegetables, and it is still cultivated locally in parts of Sichuan.¹¹⁵ In particular, the arrival of plants from America did not greatly modify the feeding system, as it did in Europe. On the other hand, 'the Chinese crops were very slow to spread out from their homeland'.¹¹⁶ We shall not be analysing the reasons for that slow expansion here, but will leave others to pursue that fascinating line of research. Instead, let us now consider the diffusion from China not of living plants, but rather of *materia medica* and the knowledge surrounding it.

(ii) *The diffusion of Chinese botanical knowledge to Japan*

In the 1st century AD a Japanese gentleman sent an emissary to the Court of the eastern Han and later, under the Sui dynasty (581–618) and the Tang (618–707), exchanges were established between the two states via Buddhist monks travelling from China and official ambassadors travelling from Japan to China, some of whom were likewise monks.¹¹⁷ On the occasion of these visits, silks, perfumes and remedies were brought back. The remedies consisted of the dried products of *materia medica* of

¹¹⁴ See pp. 482 in the preceding chapter, and Li Fan (1984); Li Hui-Lin (1969); Harlan (1992, pp. 195–211); Haudricourt and Hédin (1978, pp. 169–80); Vavilov (1951, pp. 24–5).

¹¹⁵ Two varieties of *dong han cai* 冬寒菜 (*Malva crispa* L.) are mentioned in the catalogue of vegetables cultivated in Chongqing (anon. 1961, pp. 156–8). This suggests that *Malva verticillata* L. was not the only species of mallow consumed in Chinese antiquity.

¹¹⁶ Harlan (1992, p. 199).

¹¹⁷ Francine Hérail (1986, p. 63) traces nineteen Japanese embassies to China between +600 and 894. Pages 57–104 in the same work make it possible for the reader to appreciate the way in which Japanese rulers persisted in copying Chinese methods in their administration, at the same time, however, emphasising their difference, particularly in order not to accept vassal status.

animal or plant origin with strong aromas, which were used either as medicaments or as perfumes for the house or clothing, or else as incense for Buddhist celebrations. Such objects were always accompanied by written works.¹¹⁸ In addition to such direct contacts, there were other extremely fruitful means of exchange mediated by subjects of the three states of the Korean peninsula, Koguryo, Silla and Paekje. It was, in fact, also via this route that Buddhism arrived in Japan in the 6th century.¹¹⁹ The first to introduce Chinese knowledge about *materia medica* into Japan were Korean scholars. In 415, a Korean doctor by the name of Kinmu 金武 was sent to Japan by the king of Silla, to attend the Emperor Ingyō 允恭, who was suffering from a serious disease. In the face of the success of his treatment, Chinese curative methods were recognised to be superior to local therapies and it was, in all probability, at this time that Chinese *materia medica* began to be investigated.¹²⁰ During the reign of Emperor Kinmei 欽明 (+510–71), the first texts on Chinese medicine were imported into Japan. In +602, the tenth year of the reign of the Empress Suiko 推古, a monk from Paekje, named Kwanroku 觀勒, came to Japan. He brought with him books on astronomy, geography, divination and the calendar and he taught Chinese medicine. The Japanese embassy which was sent to the Emperor Yang Di 煬帝 of the Sui dynasty in +608 included students; and Chinese works on *materia medica* were brought back to Japan when they returned. Other ambassadors also brought such works back with them. In 701, a Bureau of Medicine, *tenyakuryō* 典藥寮, sponsored by the imperial palace, was created at Nara. A herb garden (*yakuen* 藥園) was attached to it. Two ‘Masters of the Simples’ (*yakuenshi* 藥園師) taught six ‘Students of the Garden of Simples’ (*yakuensei* 藥園生) how to recognise medicinal plants and their properties. They were charged, by imperial decree, with the task of training the students to recognise *materia medica* by mastering their nature (*xing* 性), both ‘warm’ (*wen* 溫) and ‘cold’ (*han* 寒), and the aspect (*se* 色) and names (*mu* 目) of the plants. They also had to teach them how to harvest and prepare them.¹²¹ We should note one very important aspect of this transfer of knowledge about Chinese *materia medica*. As well as the importation of products, there was a concern to learn to recognise Chinese plants among the local flora. In this process, the arrival in Japan of a copy of the *Xin xiu ben cao*,¹²² produced in China by Tanabe Fubito 田邊史 in +731, was certainly of capital importance. In +787 the Bureau of Medicine made a comparative study of the *Xin xiu ben cao* and the *Shen nong ben cao jing ji zhu* 神農本草經集注 by Tao Hongjing 陶弘景. When the former was judged to be richer by a hundred or so entries, it was decided that it should be adopted in the place of the latter as a work of reference for the study of

¹¹⁸ See von Verschuer (1988, p. 21). See pp. 19–25 for a detailed description of the contents of these exchanges. It is possible to estimate that by the early 8th century around 100 Chinese works were already to be found in Japan. In 831, an ‘Inventory of Court Shops’ listed 1,500, and in 891 the ‘Catalogue of Books at Present Existing in Japan’ listed 1,759 titles (ibid., p. 24). See also Okanishi Tameto (1977, p. 341).

¹¹⁹ Yabuuchi (1983, p. 1). ¹²⁰ Shirai (1932a, p. 68). ¹²¹ Shirai (1932a, pp. 69, 26).

¹²² Ten volumes out of twenty of this copy still exist in Japan, where there are now several facsimile editions of it. See SCC Volume 6, Part 1, pp. 267–8. On the *Xin xiu ben cao* in Japan, see Wu Deduo (1979).

medicinal plants. Apart from those two texts, during the Nara period (+710–84), a number of other works were imported into Japan: the *Er ya*, the *Shan hai jing*, the *Bao pu zi nei bian*, the *Bo wu zhi*, the *Gu jin zhu* 古今注 (c.+300) by Cui Bao 崔豹 and the *Qi min yao shu*.¹²³ Another important marker in the understanding of *materia medica* in Japan, thanks to Chinese knowledge, was the completion in +918 by the ‘Grand Doctor of Medicine’, Dai’i hakushi 大醫博士 Fukane no Sukehito 深根 (深江) 輔仁, of a compilation by imperial order of the *Honzo wamyō* 本草和名 (Japanese Names of *Materia Medica*) in eighteen *juan*.¹²⁴ The work took the form of a kind of Chinese–Japanese dictionary of 1,005 entries, of which 850 were Chinese names taken from the *Xin xiu ben cao*, 105 were from various treatises on food, and fifty were from sources other than those of pharmacopoeia. For most of the entries, various Chinese synonyms were indicated, in some cases together with the name of the Chinese text from which the term came. The Japanese names were written using Chinese characters chosen for their syllabic value, as in the most ancient collection of poems in Japan, the *Man’yō-shu* 萬葉集,¹²⁵ the *man’yōgana* 萬葉仮名.¹²⁶ They were all introduced by *wamyō* 和名, the ‘Japanese name’. Similarly, in the case of the minerals cited, the text indicated their localisation if they also existed in Japan, or, if they did not, used a simple *tō* 唐, the term that designated the Tang dynasty and also, by extension, China as a whole, which indicated that the minerals were only to be found in China. Such a work already shows the extent to which the presence of Chinese texts in the domain of *materia medica* led Japanese medical literati, often at the demand of the Court, to undertake philological research in association with a naturalist and comparative investigation into the uses of their natural environment. A manuscript of this text, considered for several centuries to have been lost, was found in the Momijiyama bunko 紅葉山文庫 shogunal library¹²⁷ by a doctor of the shogunate, Taki Motohiro 多紀元簡, and was published in 1796.¹²⁸ A compilation of another very important work, the *Ishinpō* 醫心方 by Tamba no Yasuyori 丹波康賴, was completed in +984.¹²⁹ This collection, in thirty *juan*, of notes taken from Chinese texts relating to medicine and pharmacopoeia was presented to the throne two years later. The sources used for this voluminous compilation are essentially the *Xin xiu ben cao*, the *Ben cao shi yi* 本草

¹²³ Isono Naohide (2002, p. 38).

¹²⁴ Ueno Masuzō (1973, pp. 25–7, 222).

¹²⁵ For translations of the poems in this text, see Pierson (1929–63); specifically on the poems relating to plants, see Péronny (1993).

¹²⁶ Ueno Masuzō (1973, p. 26).

¹²⁷ The library of the Tokugawa family, created in 1602, which in 1639 was transferred to the place known as Momijiyama in Edo (Tokyo), where it became the shogunal library (Shinmura 1998, p. 2657).

¹²⁸ Ueno Masuzō (1973, p. 26).

¹²⁹ Ueno Masuzō (1973, p. 224). A new, reduced edition of the facsimile of the text was produced in China soon after the establishment of the People’s Republic; see Tanba Yasuyori (1955). Bernard Franck (2010, pp. 65–6) provides partial translations of this text concerning the ‘Recipe for treating illnesses caused by the aggression of spirits’, and (ibid., pp. 66–8) the ‘Recipe for treating cases in which, oppressed by a spirit when sleeping, one cannot wake up’. The original texts reproduce pp. 300 and 301 of the new Chinese edition, based on a Japanese edition dated 1857 (Ansei, 4). See Tanba Yasuyori (1955).

拾遺 (c.739) by Chen Cangqi 陳藏器,¹³⁰ and also a number of *shi jing* 食經, ‘canons of food/eating’.¹³¹ The first and the last *juan* are devoted specifically to plants. The first *juan* is subdivided into ten parts; the first nine describe various principles relating to the administration of medicaments and the last consists of a dictionary similar to the *Honzō wamyō*, in which Japanese translations are given for the Chinese names of *materia medica*. In *juan* 30, which lists the properties of animals and plants of nutritional interest, the plants are classified logically according to the three classical Chinese categories of ‘Five Grains’, ‘Five Fruits’ and ‘Five Vegetables’. This classification is justified at the beginning of the chapter by a citation that describes the relations of interdependence between foodstuffs according to the dietetic view of ancient China, as formulated in the *Su wen*: ‘the Five Grains nourish, the Five Fruits assist, the Five Domesticated Animals increase, the Five Vegetables complete’.¹³² In the course of the last part of the Heian period (+784–1185), alongside texts such as these, works by doctors and others of a different nature also promoted the transfer of Chinese knowledge concerning natural objects, although it is not easy to gauge the impact made by this kind of diffusion. These works were *shōmono* 抄物, ‘commentaries on Chinese texts’ composed within the framework of teaching the practices of esoteric Buddhism. There were very many of these, some of which, thanks to the fact that they were preserved mainly in Buddhist monasteries, still survive today. They are devoted to perfumes, medicinal plants, grains, minerals and precious metals. They are particularly important from a historical point of view as they contain original illustrations.¹³³ Finally, there are also encyclopaedic texts such as the *Wamyō ruijushō* 倭名類聚抄 (c.+931–8) (Collection of Japanese Words Classified by Category) by Minamoto no Shitagō 源順 (+911–83), which is ‘the first true dictionary of the Japanese language’.¹³⁴ Originally in ten *juan*, toward the end of the Heian period it was expanded by a further ten *juan*.¹³⁵ The names of plants are regrouped into different sections, on the one hand grains (*tōgoku* 稻穀), fruits (*kara* 菓蓂) and vegetables (*saiso* 菜蔬) for the cultivated plants that are used for food, on the other a section for wild plants that includes medicinal ones and others of an ornamental or economic interest (*sōmoku bu* 草木部), which is itself subdivided into six categories: grasses (*sō rui* 草類), ‘mosses’ (*tai rui* 苔類), lotus (*ren rui* 蓮類), *Pueraria* (*katsu rui* 葛類), bamboos (*chiku rui* 竹類) and trees (*moku rui* 木類). The ‘mosses’ category also includes lichens and usnea; the ‘lotus’ category in fact takes over all the terminology relating to the lotus that appears in the *Er ya*.¹³⁶ The reason for the establishment of the *Pueraria* category seems unclear to me for, to cite no more than the first half, it lists as successive entries the names of the *Pueraria*/kudzu bean (*ge* 葛/

¹³⁰ On this text, see SCC Volume 6, Part 1, p. 275; Okanishi Tameto (1977, pp. 76–8); Unschuld (1986, pp. 50–2).

¹³¹ Okanishi Tameto (1977, p. 350).

¹³² Tanba Yasuyori (1955, Volume 2, p. 678). For the passage from the *Su Wen*, see anon. (1978, p. 149).

¹³³ Ueno Masuzō (1973, pp. 30–1); Okanishi Tameto (1977, pp. 351–5). See anon. (1998, pp. 6–8), for reproductions of parts of these manuscripts on medicinal plants *Yaku shu shō* 藥種抄, perfumes *Kō yō shō* 香要抄 and *Kō ji shō* 香字抄 and grains *Koku rui shō* 穀類抄.

¹³⁴ Franck (2010, p. 283). My thanks go to Charlotte von Verschuer, who drew my attention to this text.

¹³⁵ Ueno Masuzō (1973, p. 223). ¹³⁶ See SCC Volume 6, Part 1, pp. 133–5.

kuzukazura 久須加豆良),¹³⁷ the wisteria (*teng* 藤/*fuchi* 布知),¹³⁸ the Chinese honey locust (*zao jia* 皂莢/*kawarabuchi* 加波良布知),¹³⁹ the common verveine (*ma bian cao* 馬鞭草/*kumzuzura* 久末豆豆良),¹⁴⁰ a lovage (*xiong qiong* 芎藭/*nakazura* 奈加豆良),¹⁴¹ the five spices (*wu wei zi* 五味/*nekazura* 禰加豆良),¹⁴² a vine (*zi ge* 紫葛/*ebi kazura* 衣比加豆良)¹⁴³ and so on. These entries are all Chinese names that are taken from a text of which either the title or the author is cited; the names that are used by Su Jing and Tao Hongjing are the ones that appear most frequently, along with those from the [*Shen nong*] *Ben cao* [jing]. However, the choice of reference works is not limited to texts on *materia medica*; the author has also quoted abundantly from Chinese works of a lexicographical nature, such the *Er ya zhu* 爾雅注, the *Tang yun* 唐韻, the *Wen zi ji lue* 文字集略, the *Si sheng zi yuan* 四聲字苑, the *Yu pian* 玉篇, the *Bian se li cheng* 辨色立城, the *Jian ming yuan* 兼名苑 and so on. Next come possible Chinese synonyms and then the Japanese name or names, transcribed in *man'yōgana* as shown in an earlier example. Another glossary, which takes account solely of the names of *materia medica*, was completed in 1284. The *Honzō iroha shō* 本草色葉抄 (An ABC of *Materia Medica*) by Koremune Tomotoshi 惟宗具俊 is based on the Da Guan period (1107–11) edition of the *Zheng lei ben cao*. This dictionary lists between 5,900 and 6,000 names;¹⁴⁴ that figure includes the ‘correct names’, *zheng ming* 正名, in the Chinese text, as well as synonyms and names copied from the *Honzō wamyō*. This vocabulary does not stem exclusively from medical texts. Of the thirty-three titles listed, twelve belong to other literary genres: lexicographical texts such as the *Er ya*, together with the commentaries by Guo Pu, the *Guang ya*, the *Yu pian*, notes by literati such as the *Meng qi bi tan*, poetic texts by Su Dongpo (Su Shi), poems from the *Shi jing*, commentaries on the names of plants mentioned in those poems (*Lu ji cao mu shu*), the *Tai ping yu lan* encyclopaedia, and so on. This vocabulary as a whole is classified according to two criteria. The ancient *iroha* order of the Japanese syllabary, following the Japanese pronunciation of the Chinese words, announced in the title, conveys the general framework of the classification. Within each of these syllabic categories the names are arranged according to the order of the categories of the *Zheng lei ben cao*: metals and minerals, grasses, trees, humans, beasts, flying creatures, insects/fish, fruits, grains, vegetables, and things named but not used. Each of the names is followed by a brief note of information: a reference to the number of the *juan* for the entries taken from the *Zheng lei ben cao*, synonyms, and sometimes a note on usage. This text seems to be a vade-mecum for specialists, enabling them to find information easily. It is neither a dictionary of the names of

¹³⁷ *Pueraria* sp.

¹³⁸ *Wisteria sinensis* Sweet. We should note that the use of this sole character to designate wisteria is considered incorrect in present-day Japanese, according to Makino Tomitaro (1970, p. 303).

¹³⁹ *Gleditschia japonica* Miq. Cf Makino Tomitaro (1970, no 1182, p. 296).

¹⁴⁰ *Verbena officinalis* L. Cf Makino Tomitaro (1970, no 2060, p. 515).

¹⁴¹ *Ligusticum wallichii* Franch. 141. *Schizandra chinensis* (Tuc.) Baill.

¹⁴² *Vitis thunbergii* Sieb. et Zucc. Cf Makino Tomitaro (1970, no 1518, p. 380).

¹⁴³ Ueno Masuzō (1973, p. 232); Isono Naohide (2002, p. 73). ¹⁴⁴ Ishihara Akira (1968, p. 626).

materia medica, nor a natural-history text. Rather, it is a precious tool of reference for Chinese and Japanese *materia medica*, for the use of practitioners.

The texts described above give an idea of the specialised literature that was produced, at first, in Japan, on the natural products mentioned in Chinese works, beginning with pharmacopoeia. As can be seen, attention was paid mostly to names. The arrival of the *Ben cao gang mu* at the very beginning of the 17th century was to modify this state of affairs profoundly.

The Japanese doctors who took an interest in the *Ben cao gang mu* were all literati (*shi* 士) who had been educated in schools reserved for the sons of families in the military class, in which the teaching consisted of a study of the canonical Chinese texts. So they were perfectly familiar with the classical Chinese language. Trained in neo-Confucian thinking,¹⁴⁵ those who did not choose to enter the military profession would, in many cases, take up the role of 'Confucianist' official (*jusha* 儒者) or that of doctor in the household of one of the various local lords. Their medical knowledge, acquired under a master, was essentially founded on Chinese medicine, so they were able to understand the technical, medicinal aspect of the Chinese texts. 'Translation' of those texts was limited, at best, to the addition, alongside the Chinese characters, of signs (*kunten* 訓點) that made a 'Japanese' reading of the classical Chinese texts (*kanbun* 漢文) possible. No literary Japanese translation (*bungo* 文語) appears to have been envisaged, initially at least, given that these specialists had already mastered the *kanbun* that they used in their own writings. However, ever since the introduction of the first Chinese works on *materia medica*, as we have seen, Japanese scholars were keenly aware of the possible differences between the minerals, fauna and flora of Japan and those of China, even though there may also have been common species or closely similar ones.¹⁴⁶ In truth, the crucial problem of translation was that posed by the identification of the names of the products cited in the Chinese texts. This task was doubly important: on the one hand it was of practical importance, since it concerned the correct use of the products in medicine; and it was also of economic importance in that the presence of local products made it possible to organise a well-judged supply of them and certainly at a more economical price than the far more expensive products imported from China. The various lexicographical tools that had been composed in Japan ever since the 10th century, with the aim of providing Japanese equivalents to the names of Chinese *materia medica*, were intended to aid the comprehension of the Chinese treatises that were introduced. Evidently the use of the knowledge transmitted by these Chinese pharmacopoeias inevitably depended on recognising the *materia medica* that was cited. All the same, it is worth noting that the various Japanese glossaries were interested almost exclusively in nomenclature and offered hardly any morphological information regarding the things that those words designated.

¹⁴⁵ See Horiuchi Annick (1994).

¹⁴⁶ On the relations between Chinese and Japanese flora, see Zheng Mian (1984); for an account of the flora and vegetation of Japan, see Numata (1974).

After the *Ben cao gang mu* arrived in Japan, its intrinsic richness was to stimulate this ancient lexicographical work by widening the truly naturalist content of any pharmacological work. In any case, such research was contemporary with, and doubtless complementary to, the inventories of natural resources within their territories that various local lords commissioned from their doctors.

The first mention of the *Ben cao gang mu* in Japan occurs in the *Kiken shomoku* 既見書目 (1604) (Catalogue of the Books That We Have Seen), composed by Hayashi Razan 林羅山 (1583–1657).¹⁴⁷ This author, who came from a family of literati, in 1607 travelled from Kyoto to Sunpu (Shizuoka), to which the first Tokugawa 徳川 shogun, Ieyasu 家康 (1542–1616) had retired. The latter ordered him to become a monk and from then on Hayashi went by the name Dōshun 道春. The new shogun, Hidetada 秀忠, summoned him to Edo, where he appointed him ‘Confucianist’ of the Bakufu (*Bakufu no jusha* 幕府の儒者). Dōshun was then ordered to go to Nagasaki, where, in 1607, he was given a copy of the *Ben cao gang mu* that belonged to Ieyasu.¹⁴⁸ In the following year, 1608, Manase Gensaku (1549–1631) 曲直瀬玄朔 referred to the *Ben cao gang mu* for the first time in a Japanese medical text, the *Yakushō nōdoku* 藥性能毒, by his master, Manase Dōsan (1506–94) 曲直瀬道三, which had been revised and extended.¹⁴⁹ In 1612, Dōshun (Hayashi Razan) completed the manuscript of the *Tashiki-hen* 多識編 in five *juan*, a glossary that reproduced the names of the entries in the *Ben cao gang mu* according to the original classification, adding to them the Japanese names, but without providing any complementary explanations.¹⁵⁰ This work is considered to be one of the major Japanese texts of the nominalist school.¹⁵¹ In 1614, Manase Gensaku obtained a copy of the original edition of the *Ben cao gang mu*, soon after the one possessed by Ieyasu had been taken to Edo, at the request of Hidetada.

In 1637, there appeared for the first time, in Kyoto, a *Ben cao gang mu* printed from plates that reproduced the second edition of the Shiju Pavilion, the Jiangxi edition (1603), complete with punctuation marks for reading it in the *kunten* 訓點 Japanese manner. It is not known who was responsible for this edition.¹⁵² This text was to be the source of five other editions, one of which, produced in 1653, contained illustrations that had been modified to resemble those in the Chinese edition of 1640 (*Wulin qian ya ben* 武林錢衙本), although the text was still printed from the plates used in the earlier edition.

The second Japanese re-edition, which became the source for three further ones, likewise complete with punctuation marks, was the work of Nomura Kansai 野村觀齋. It is dated 1659 and is also based on the Chinese edition of 1640. The ‘revised’ woodcuts were used for a new edition in 1669 by Matsushita Kenrin 松下見林. Soon after, in 1672, Kaibara Ekiken 貝原益軒 (1630–1714) in his turn produced a

¹⁴⁷ See Isono Naohide (2002, p. 102).

¹⁴⁸ This was the Jianxi edition (1603). See Isono Naohide (2002, p. 104).

¹⁴⁹ See Isono Naohide (2002, p. 105).

¹⁵⁰ The work was published in 1630; see Ueno Masuzō (1973, p. 249).

¹⁵¹ Cf Ueno Masuzō (1973, p. 250); Isono Naohide (2002, p. 109).

¹⁵² Cf Isono Naohide (2002, p. 121).

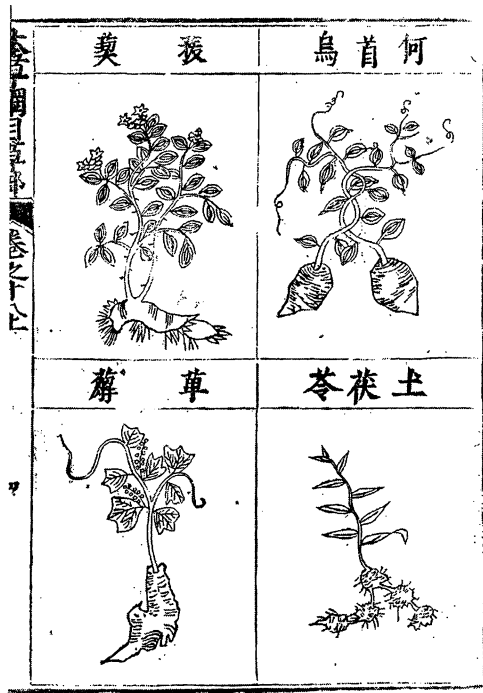


Fig. 180. An example of illustrations borrowed from *Ben cao gang mu* (1640 edn) for a Japanese edition of *Ben cao gang mu*, *Honzō zu yoku* 本草圖翼 (1714, *juan* 18, *cao bu* 草部, 4a) by Ino Jakusui.

version based on the Wulin edition, entitled *Kōsei Honzō kōmoku* 校正本草綱目 (Revised Edition of the Ben Cao Gang Mu) in thirty-nine *juan*. Kaibara Ekiken, who was not only a member of the literati but also a popularising doctor,¹⁵³ followed each *juan* with a glossary of the Japanese names of *materia medica*, alongside the Chinese names.¹⁵⁴ The year 1714 saw the appearance of a new edition of the *Ben cao gang mu*, the work of another ‘Confucianist’ doctor, attached to the Kaga clan, Ina Nobuyoshi 稻宣義 (1655–1715), better known as Inō Jakusui 稻若水 (or 稻生若水).¹⁵⁵ This publication consisted of three parts, a ‘Shin kōsei Honzō kōmoku’ 新校正本草綱目 (*Ben cao gang mu*, Newly Revised) in fifty-three *juan*; a complement of illustrations in four *juan*, entitled ‘Honzō zu yoku’ 本草圖翼 (Illustrated Wings of *Materia Medica*), and a treatise composed by Inō Jakusui, the ‘Keppōkyo besshū’ 本草圖翼, also in four *juan*, which contained descriptions of twenty-nine medicinal products, plants and animals that were little known, such as the groundnut. The illustrated part of this work contained three *juan* of plates reproduced from the 1640 Wulin edition of the *Ben cao gang mu* (Fig. 180) and the four ‘wings’ that reproduced the engravings from another Chinese pharmacopoeia, the *Ben cao yuan*

¹⁵³ Cf Horiuchi Annick (1994).

¹⁵⁴ Cf Ueno Masuzō (1973, p. 272).

¹⁵⁵ Cf Ueno Masuzō (1973, pp. 308–9).

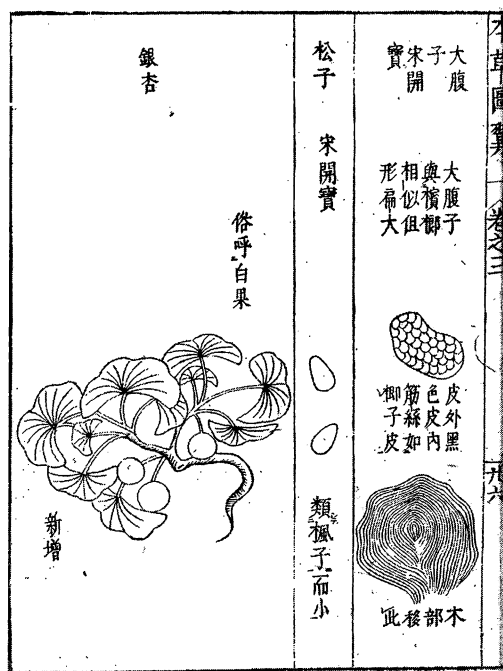


Fig. 181. An example of illustrations borrowed from *Ben cao yuan shi* (1612) used in *Honzō zu yoku* 本草圖翼 (1714, *juan* 3, 26b), a supplement to the Japanese edition of *Ben cao gang mu* by Ino Jakusui.

shi 本草原始 (Origin of *Materia Medica*, 1612) by Li Zhongli 李中立 (Fig. 181). This choice illustrates the method of this editor, which is characterised by a respect for the original text, but also by the addition of an annex that enabled the reader to get more out of it. While the illustrations of the *Ben cao gang mu* itself for the most part represent the plants, animals and minerals that provided the *materia medica*, the engravings of the second work were essentially detailed illustration of the parts of them that were used, such as the roots, the fruits and the leaves.¹⁵⁶

Okanishi Tameto has divided the fourteen earliest editions of the *Ben cao gang mu* in Japan into three series with different formats:¹⁵⁷

1. Large format. Six publications based on the 1637 edition. Text and engraved images copied from the Jiangxi edition, except in 1653 and 1714, when the images are based on those of the Wulin edition (1640).
2. Small format. Three publications following that of Nomura Kansai (1659). Illustrations based on those of the Wulin edition.
3. Intermediate format. Five publications based on Kaibara Ekiken (1672). Illustrations based on the Wulin edition. Japanese nomenclature is added.

¹⁵⁶ For examples of these illustrations, see Haudricourt and Métaillé (1994, pp. 398–400).

¹⁵⁷ Okanishi Tameto (1977, pp. 229–30).

The number of these editions and the rapidity with which the first one appeared, less than forty years after the work was first mentioned in Japan, testify not only to the interest that this book prompted,¹⁵⁸ but also to the dynamism of those who republished it. From another point of view, the rarity and the high cost of Chinese books and the difficulty that many readers faced when reading a text without *kunten* were no doubt also factors that favoured the diffusion of these Japanese editions of the *Ben cao gang mu*.

The interest of the book from a medical point of view is understandable enough, but the purely medical part of the book was not the object of translations,¹⁵⁹ for it was directly comprehensible to Japanese doctors, who could read the text in Chinese all the better given that it had been complemented by *kunten* in the Japanese editions. On the other hand, the naturalist section of the work did pose problems of comprehension, as we have seen above. Identification of the *materia medica* cited in the Chinese text was indispensable for a correct application of the numerous therapeutic indications given in the original Chinese. Quite apart from this purely practical medicinal aspect, the working method of the translators led to an inventory of the local resources and, as a result, the *Ben cao gang mu* came to play an important role in the development of natural history in Japan. I shall now elaborate this point by discussing the scientific procedure of Kaibara Ekiken, Inō Jakusui and Ono Ranzan, three doctors who 'edited' the text in Japan.

Kaibara Ekiken 貝原益軒 (also known as Atsunobu 篤信) (1630–1714) was born into a military-class family in which the father worked in the service of the lords of the Kuroda clan, of the fiefdom of Fukuoka. He had a classical Japanese and Confucian education and at the same time studied medicine and pharmacopoeia with his father. He was not only a commentator on the Chinese Confucian classics, but also a great populariser in the modern sense of the term.¹⁶⁰ To cite but two examples, as well as various works designed to facilitate an understanding of Chinese *materia medica*, in 1672 he published the revised edition of the *Ben cao gang mu* mentioned above and, at the age of eighty-three, in 1713, he produced a synthesis of knowledge in the domain of hygiene, the *Yōjōkun* 養生訓 (Instructions for the Nourishment of Life). Earlier, in 1680, he had composed a glossary of the names of the *materia medica* of the *Ben cao gang mu* in Japanese, *Honzō kōmoku mokuroku wamyō* 本草綱目目錄和名,¹⁶¹ in 1698 he had published a *Ka fu* 花譜 (Treatise on Flowers) and in 1704 he completed the manuscript of a treatise on all the vegetables, *sho sai fu* 諸菜譜, that was to be published ten years later under the title *Sai fu* 菜譜 (Treatise on Vegetables).¹⁶² But it is another book that now claims our attention, the *Yamato*

¹⁵⁸ See the list of thirty texts based on the *Ben cao gang mu* (re-editions and others) published during the Edo period, discovered by Pan Jixing (1980, pp. 140–1).

¹⁵⁹ The first exhaustive translation of the *Ben cao gang mu* in Japanese was the work of a team of eight specialists from various disciplines. This translation, entitled *Kōkuyaku Honzō kōmoku* 國譯本草綱目, consists of fifteen volumes that were published between 1931 and 1937 in Tokyo by the Shunyōdō 春陽堂 publishers under the scientific direction of Shirai Mitsutarō 白井光太郎.

¹⁶⁰ See note 154.

¹⁶¹ Isono Naohide (2002, p. 153).

¹⁶² Ueno Masuzō (1973, p. 295, 300).

honzō 大和本草 (Natural History of Japan¹⁶³) (1709), which at first sight seems very similar in its conception to the *Ben cao gang mu*. The two books have a similar structure, with all the illustrations placed at the end, after several volumes of text. A comparative study of the two books certainly confirms the importance of the works of Li Shizhen. For example, of the 1,362 products named in the *Yamato honzō*, the names of 772 of them come from the *Ben cao gang mu*.¹⁶⁴ However, for Kaibara Ekiken, it was not a matter of a simple transposition of a work on China into a Japanese context, for the book that he wrote is not a treatise on Chinese *materia medica*, but concerns products that existed in Japan, such as plants, animals and minerals, and that might be of interest in a number of different domains. Thus, alongside products named in the *Ben cao gang mu*, we find 203 other products bearing Chinese names but not cited by Li Shizhen, and also 358 kinds (*shū / zhong*, 種) with only Japanese names, as well as twenty-nine kinds of foreign origin.¹⁶⁵ Being well aware of the differences between Japan and China, as he explains in 'Butsuri o ronzu' 論物理¹⁶⁶ (Discourse on the Principles of Things), another text presented as a Foreword to his *Yamato honzō*, Ekiken recognised how difficult it was to name Japanese *materia medica*. It was precisely with the aim of correctly classifying Japanese products that he embarked upon a critical reading of the *Ben cao gang mu*; and this led him to make some choices quite different from those of Li Shizhen. The first choice was certainly to write not in classical Chinese but in Japanese (*bungo* 文語), and this testified to his desire to popularise the material. Despite its title, the book is not presented as a work on *materia medica*, but rather as a popular encyclopaedia that notes useful ways of using natural products in daily life. So it does not contain medicinal recipes such as those to be found in Li Shizhen's work. The (theoretical) medicinal aspect of the text is present in only one of the very first chapters, entitled 'Kusuri o mochiiru o ronzu' 論用藥 (Discourse on the Use of Medicinal Products). Moreover, the first of his 'notices', *hanrei* 凡例, points out that

I have chosen to collect together in this book the quintessence of the information in the *Ben cao gang mu*. Those who wish to learn in detail about the form, nature and taste of all the products – which they will not find in this work – must attentively study the *Ben cao [gang mu]* itself.¹⁶⁷

In doing so, he deliberately left out one aspect of the *Ben cao gang mu* that is fundamental to therapeutics: namely, for each of the products of *materia medica*, a reference to the 'yin–yang Five Phases' system (*Yin yang wu xing lun* 陰陽五行論), through their nature (*xing* 性) and their taste (*wei* 味). It is knowledge of this kind of information that makes it possible for a doctor, once he has made a diagnosis, to choose which products to use as remedies. Furthermore, whereas in Li Shizhen the grains, vegetables and fruits are taken into consideration only as *materia medica*, it

¹⁶³ The choice of this translation is justified below. ¹⁶⁴ Kaibara Ekiken (1975, p. 6).

¹⁶⁵ Kaibara Ekiken (1975, p. 6). ¹⁶⁶ Kaibara Ekiken (1975, pp. 16–17).

¹⁶⁷ Kaibara Ekiken (1975, *Hanrei* p. 1).

seems that in Ekiken's work that is not the case, as is confirmed by an analysis of his classification. In this domain, even if he has followed the fundamental principle that guides Li Shizhen, moving up from the inanimate eventually to get to the human, 'from the smallest to the greatest and from the lowly to the precious',¹⁶⁸ he nevertheless noticeably modifies the nature of the categories of the Chinese author. His attitude seems to me to reflect a twofold choice: on the one hand a consideration of the role of plants and animals in the social context of late 17th-century Japan, and on the other a manifest desire to reach a general audience. Finally, as the citation above reminds us, when it is a matter of the strictly medicinal use of natural products, he suggests that specialists should immerse themselves in a study of the *Ben cao gang mu* itself. Kaibara Ekiken is certainly not sparing in his comments on Li Shizhen's work. At the beginning of the *Yamato honzō*, in his 'Honzō sho o ronzu' 論本草書¹⁶⁹ (Discourse on Books on *Materia Medica*), he picks out contradictions in the way in which plants are classified in the *Ben cao gang mu*. He is amazed, for example, that a chrysanthemum (*ju* 菊) and artemisias (*ai* 艾), which are all perfumed, are not in the category of 'perfumed grasses' (*fang cao* 芳草). He finds it strange that these plants are included in the category of 'grasses of humidity' (*shi cao* 濕草) since, according to him, they grow better in dry places and the chrysanthemum cannot tolerate excessive humidity. He also remarks upon the fact that other plants that his contemporaries appreciate as vegetables are not considered to be vegetables by Li Shizhen, while others that are not edible are classed as vegetables. He is particularly shocked by the fact that freshwater plants (*dan shui zao* 淡水藻), marine algae (*hai zao* 海藻) and fish (*yu* 魚) do not have categories of their own. Continuing his criticisms in the following chapter, 'Butsuri o ronzu' 物理論 (Discourse on the Principle of Things),¹⁷⁰ he writes that he cannot understand why bamboo, which all ancient Chinese texts consider to be a grass (*cao* 草) and that Dai Kaizhi 戴凱之, the author of the *Zhu pu* 竹譜 (Treatise on Bamboos) (?460), defined as 'neither a grass nor a tree but a plant' (*fei cao fei mu zhi wu ye* 非草非木植物也), should be classed in the category of trees and does not rate a category of its own. He reaches the conclusion that there are three principal categories, three classes (*to* 等), of plants (*shokubutsu* 植物): grasses, trees and bamboos. In similar manner, since fish are neither birds nor beasts, for him they form a distinct group. So he also distinguishes three fundamental classes among the animals: the birds (*chō/tori* 鳥), the beasts (*kedamono* 獸) and the fish (*gyo/uo/sakana* 魚). He adds that in the category of plants (*shokubutsu rui* 植物類) there are also mosses (*tai/geke* 苔) and mushrooms (*kin* 菌). Because these are the smallest of plants, they cannot be placed on the same level as the grasses, trees and bamboos; the same goes for insects/bugs¹⁷¹ (*mushi* 蟲) and animals with carapaces/shells (*kai* 介) in comparison to birds, beasts and fish.

¹⁶⁸ On this aspect of Li Shizhen's work, see above, pp. 78, 115, and Métaillé (2001a).

¹⁶⁹ Kaibara Ekiken (1975, pp. 5–7). ¹⁷⁰ Kaibara Ekiken (1975, p. 15).

¹⁷¹ My decision to translate *mushi* (Chinese *chong*) as 'bug' rather than 'insect' is deliberate. In this way, an ambiguity is avoided. In entomology, 'insect' has a precise and restricted sense, but in everyday language its meaning is far wider, encompassing spiders, nematodes, worms etc. Given that in both Japan and China, the

So how did he present the whole collection of natural objects in his work? By seeking to accommodate the principles that he laid down with the progression in the chain of beings according to the general model provided by the *Ben cao gang mu*. However, he did not systematically adopt that book's principle of two levels – the sections (*bu* 部) and the categories (*lei* 類).¹⁷²

First he presents (see Table 18) the categories of waters, fires, metals and minerals. Next come the plant products, starting with the herbaceous plants, followed by grains, fermented products, vegetables, medicinal herbs, grasses used for technological purposes, grasses with flowers, garden grasses, the 'fruits of grasses', fragrant grasses, freshwater grasses, marine algae and finally 'various' grasses along with mushrooms and bamboos. Next he lists the trees: essential trees, medicinal trees, garden trees, flowering trees and finally various other trees. Next, the fish are divided into two groups, river fish and sea fish. Then come the insects/bugs, *mushi*, also divided into two groups, the aquatic ones and the terrestrial ones. Finally he lists animals with shells or carapaces, aquatic birds, mountain birds, little birds, poultry, 'various' birds and foreign birds, beasts and human (products).

Upon reading this list, one sees that, in fact, *materia medica stricto sensu*, which seems to be confined to herbaceous and woody plants, occupies only a small space within the whole. It is noticeable that a very particular place has been reserved for 'grains', a category which, as in Li Shizhen's work, is not limited to cereals but includes vegetables such as soya, and also buckwheat, groundnuts and sesame. He has presented these first, before all other plants and as a category in themselves, in the first section of *juan* 4, which also includes products obtained by fermentation. So, unlike in Li Shizhen's work, the 'grains' do not formally belong to the 'grasses', which start in the following *juan*. This suggests that Ekiken favoured the popular point of view by emphasising whatever was most important for people's lives, whatever ensured basic foodstuffs, both plants and products derived from them.

Most of his categories, based essentially on usage or ecology, form sharply contrasting groups in which, however, not everything can be placed. Hence the device of undifferentiated groupings – labelled 'various' (雜 *zāo*, *zatsu*) among the grasses (*zassō* 雜草), trees (*zōki/zōboku* 雜木) and birds (*zakkin* 雜禽) – which can accommodate anything that cannot find a place elsewhere. He also differs from Li Shizhen in that he introduces new categories for plants and animals. For the plants, he creates parallel categories for the grasses and the trees: medicinal grasses and trees (*yaku rui* 藥類 and *yakumoku rui* 藥木類) and herbaceous plants and trees that serve as basic matter for technological activities (*min.yō[sō]* 民用[草]類 and *shiboku/yommoku rui* 四木類);¹⁷³ and he does the same for ornamental plants, *kasō*

semantic field in ancient texts is even extended to include small batrachians and certain reptiles, 'bug' seemed to me to be better suited. For a discussion on *chong* see Fèvre (1993). On *mushi*, see Laurent (2002).

¹⁷² See Métaillé (2001a, pp. 227–42).

¹⁷³ This category in fact includes fifty-one trees.

Table 18. *Classification of natural objects in Yamato honzō by Kaibara Ekiken*

大和本草分類	
卷之三	<i>sui rui</i> 水類 (11 種) waters <i>kai rui</i> 火類 (10 種) fires <i>kingyoku toseki</i> 金玉土石 (66 種) metals/minerals
卷之四	<i>geku rui</i> 谷類 (26 種) grains <i>zōjō rui</i> 造釀類 (29 種) fermented products
卷之五 草之一	<i>saisho rui</i> 菜蔬類 (67 種) vegetables
卷之六 草之二	<i>yaku rui</i> 藥類 (79 種) medicinal herbs <i>min.yōsō rui</i> 民用草類 (7 種) ethnobotanic plants
卷之七 草之三	<i>kasō</i> 花草 (73 種) flowers <i>ensō rui</i> 園草 (18 種) horticultural plants
卷之八 草之四	<i>ra rui</i> 蓏類 (9 種) gourds <i>tsurukusa rui</i> 蔓草 (37 種) climbing plants <i>hōsō rui</i> 芳草 (16 種) perfumed plants <i>suishō/mizukusa rui</i> 水草 (36 種) freshwater grasses
卷之九 草之五	<i>kaisō rui</i> 海草 (28 種) saltwater grasses <i>zassō rui</i> 雜草 (137 種) various grasses <i>kin rui</i> 菌類 (25 種) mushrooms
卷之十 木之上	<i>chiku rui</i> 竹類 (22 種) bamboos <i>yommoku rui</i> 四木類 (7 種) 4 trees
卷之十一 –	<i>kamoku</i> 果木 (44 種) fruit trees <i>yakumoku</i> 藥木 (32 種) medicinal trees
卷之十二 木之下	<i>enboku</i> 園木 (36 種) ornamental trees <i>kaboku/hana no ki</i> 花木 (40 種) flowering trees
卷之十三 魚之上:	<i>zōki/zōbokui</i> 雜木 (92 種) various trees
– 魚之下	<i>kagyo/kawa uo</i> 河魚 (39 種) freshwater fish
卷之十四 蟲之上	<i>kaigyo</i> 海魚 (83 種) saltwater fish
– 蟲之下	<i>suichū</i> 水蟲 (22 種) aquatic insects <i>rikuchū</i> 陸蟲 (64 種) terrestrial insects
卷之十五	<i>kairui</i> 介類 (54 種) animals with carapaces <i>mizudori/suichō</i> 水鳥 (26 種) aquatic birds
	<i>yamadori</i> 山鳥 (13 種) mountain birds
	<i>getori</i> 小鳥 (37 種) small birds
	<i>kakin</i> 家禽 (4 種) poultry
	<i>zakkin</i> 雜禽 (10 種) various birds
卷之十六	<i>ihōkin</i> 異邦禽 (10 種) exotic birds <i>jū rui</i> 獸類 (47 種) beasts <i>jūn rui</i> 人類 (10 種) humans

花草, ‘grasses with flowers’, and *ensō* 園草, ‘garden grasses’, on the one hand and *kaboku* 花木, ‘trees with flowers’, and *enboku* 園木, ‘garden trees’, on the other. As we have noted above, he introduces the category of bamboos (*chiku rui* 竹類) alongside grasses and trees. For aquatic plants, he draws a clear difference between freshwater

plants (*suisô rui/mizukusa rui* 水草類) and marine plants (*kaisô rui* 海草類). For fishes, he does the same. These details show how involved Ekiken was with concrete experience, and they indicate the influence that was exerted upon his classifications by cultural behaviour that was noticeably different from behaviour in China. In his description of products, he cites plenty of Chinese references – pharmacopoeias (*ben cao*), but also horticultural treatises such as the *Hua jing* (花鏡) (Mirror of Flowers, 1688) by Chen Haozi 陳淞子. Initially he based his study on the *Ben cao gang mu*, but what is remarkable is that he eventually produced a work that is altogether original in comparison to the whole body of Chinese literature on *materia medica* (*ben cao/honzô*). His *Yamato honzô* mentions no medicinal recipes but does describe the resources offered by nature in Japan both for taking care of one's health and for other purposes. Kaibara's book prioritises the naturalist side of what, in Li Shizhen, is primarily *materia medica*. It seems to me that the meaning of *honzô* in the title shifts its meaning, to signify not *materia medica* so much as 'natural history', for the book is certainly one of the markers, if not the first one, pointing the way toward Japanese natural history.¹⁷⁴

Inô Jakusui 稻生若水 (1655–1715), a contemporary of Kaibara Ekiken, was born in Edo. His name was Noriyoshi 宣義, his personal name was Ayanobu 彰信 and he often went by the names Shôsuke 正助, Jakusui 若水 or even, in the Chinese manner, Tō Jakusui 稻若水.¹⁷⁵ Between 1673 and 1680, he studied pharmacopoeia in Osaka, with Fukuyama Tokujun 福山徳潤, who had acquired his knowledge in the domain of Chinese *ben cao* from Ro Sōseki 盧艸碩, the grandson of a Chinese from Fujian who had settled in Nagasaki in 1612.¹⁷⁶ In 1692, he published a collection on the preparation of drugs entitled *Hōsha zensho* 炮炙全書 (A Summary of Concoctions), with a preface by Kaibara. The work considers 471 essentially Chinese products of animal, plant and mineral origin, and the text mostly consists of citations from Chinese works. An annex lists the Chinese names of 1,220 products, of which 801 are plants, 356 are animals and sixty-three are minerals. Ten years later, in a second edition of the book, that list increased to contain 1,392 products. On the recommendation of a friend, Taka Shinano 多加信濃, in 1693 he entered, as a 'Confucianist' (*jusha* 儒者), the service of Maeda Tsunanori 前田綱紀 (1643–1724), the lord of the Kaga fiefdom.¹⁷⁷ In the following year, he offered the latter *Kanazawa sōmoku roku* 金沢草木録 (Notes on the Plants of Kanazawa).¹⁷⁸ One year later, he offered him, through the intercession of Taka Shinano, a collection of notes taken from a hundred or so Chinese texts on the subject of 181 wild and cultivated vegetables available in Japan; it was entitled *Shokumotsu denshin san* 食物傳信纂 (A Collection of Knowledge about Foodstuffs), in twelve *juan*.¹⁷⁹ Remarkably, the citations come not so much from *ben cao* but rather from other technical

¹⁷⁴ On the work of Kaibara Ekiken, see Horiuchi Annick (1994, pp. 120–7); Métaillé (2001b).

¹⁷⁵ Ueno Masuzō (1973, p. 264).

¹⁷⁶ Ueno Masuzō (1973, p. 46).

¹⁷⁷ Ueno Masuzō (1973, p. 285).

¹⁷⁸ Isono Naohide (2002, p. 169).

¹⁷⁹ Ueno Masuzō (1973, p. 289).

texts, in particular works on agriculture such as the *Qun fang pǔ* 群芳譜 (Treatise on All the Flowers, c.1620) by Wang Xiangjin 王象晉 and the *Nong zheng quan shu* 農政全書 (A Complete Treatise on the Economy of Agriculture, 1639) by Xu Guangqi 徐光啟. The collection also contains numerous citations from local Chinese monographs. The text is in *kanbun*. For every Chinese name entered the Japanese vernacular names are given – in *man'yōgana* – together with an indication of their geographical origin. This text greatly pleased its recipient, who in 1696 ordered his doctor to produce, on the same model, a great encyclopaedia of natural products in 1,000 *juan*, entitled *Shobutsu ruisan* 庶物類纂 (A Collection of the Categories of Things). This monumental work was not to be completed until 1747, by Niwa Shōhaku 丹羽正伯 (Teiki 貞機) (1691–1756), who was a disciple of Inō Jakusui, after the latter's death. This great compilation contains the same kind of Chinese sources, the difference being that the citations from treatises on *materia medica*, including the *Ben cao gang mu*, are more frequent. Even though Jakusui was only able to complete 362 of the planned 1,000 *juan* by the time of his death, in the history of Japan his name remains associated with this great work.¹⁸⁰ However, there also exist various manuscripts of works never published, in particular the *Jakusui Honzō hiroku* 若水本草秘錄 (Secret Memoir by Jakusui on the *Ben cao* [*gang mu*]), which is preserved in the collection of the Makino Library in Kochi.¹⁸¹ These 'notes', which are undated, concern *juan* 5–52 of the *Ben cao gang mu*; that is to say, all the parts of this book that are devoted exclusively to *materia medica*. To judge from a reading of them, they seem to have been intended for publication or else to serve as the basis of a course of teaching, for the author writes in Japanese *bungo* (文語), with rare passages in classical Chinese *kanbun* (漢文). He always starts by indicating one or several Japanese names in *katakana*, alongside the Chinese name. In some cases, he adds Chinese synonyms that Li Shizhen does not give. He always specifies whether the *materia medica* is produced locally in Japan, and if that is so he names the regions of production. In the case of plants, he also indicates whether it is an imported species or a native one. He systematically notes whether a Chinese species is cultivated in the shogunal Garden of Medical Herbs in Edo, *Go-yaku-en* 御藥園, which he also refers to as *Edo go-en* 江戸御園. He furthermore notes, as in the case of *Hemerocallis* (*xuan cao* 萱草, Japanese names *kenzō*, *wasuregusa*),¹⁸² whether similar Japanese species exist or whether, as in the case of *di huang* (地黃, Japanese names *saohime*, *nanohagusa*),¹⁸³ there were originally no such plants in Japan but now the Chinese species is produced there. He adds details of his own, indicating, for example, that the *Hemerocallis* with double flowers should not be used as they are poisonous. He challenges certain identifications and even makes drawings to clarify what he writes. Clearly, all this results from systematic and critical research into the

¹⁸⁰ See, for example, Tuge (1968, p. 36).

¹⁸¹ Manuscript no 4466. My thanks go to the curator, Madame Komatsu Michi, for her help in my researches in this wonderful library.

¹⁸² *Hemerocallis* sp. ¹⁸³ *Rehmania glutinosa* Libosch.

mineral, vegetable and animal products that correspond to all the entries in the *Ben cao gang mu*, as compared to the reality in Japan. It is noticeable that, for plants, he uses for reference the plantations in a botanical garden. We should also note that he only takes into consideration the naturalist aspect of the Chinese work, and makes no references to medicinal recipes. Nevertheless, even if one detects a naturalist purpose in Jakusui's work, his first concern remains the correct identification of *materia medica* through his efforts at naming, and this certainly reflects his attachment to the nominalist movement, *meibutsufaku* 名物學, which is the Japanese formula for the *zheng ming* (正名), the Chinese 'correction of names' or 'rectification of names'. This concern to use the right names for things suggests that his purpose in compiling these notes was to eliminate all ambiguity in the nomenclature, in order to promote a confident use of the formulae of the *Ben cao gang mu* in medical practice – this, of course, had likewise been Li Shizhen's concern when he composed his great work.

Ono Ranzan 小野蘭山 (1729–1810) (personal name Motoharu 職博), who was born in Kyoto, developed a passion for plants when he was very young and, at the age of thirteen, he became the pupil of a doctor who was a disciple of Inō Jakusui, Matsuoka Joan 松岡恕庵 (Gentatsu 玄達) (1668–1746). The *Ben cao gang mu* occupied an important place in the teaching dispensed by the latter, and in 1724, one of his audience, Minekawa Sansetsu 嶺川三折, had completed the manuscript of the notes that he had taken during the lectures entitled *Honzō kōmoku kaishi* 本草綱目會誌 (Documents on Meetings [Devoted to the] *Ben cao gang mu*).¹⁸⁴ A few years later, Ono Ranzan, in his turn, presented the results of his researches on the Chinese book, in the form of lectures, as is attested by a number of manuscripts produced by his listeners, which have been preserved in modern Japanese libraries. Thus a *Chin kō kaisetsu* 珍綱解説 (Explanations on the [*Ben cao*] *Gang* [*mu*] by [Li Shi] Zhen) corresponds, essentially, to the notes of a disciple, Ishida Ki 石田熙, taken at the time of the master's lecture delivered on the first day of the sixth month, in 1775. Soon after this, another disciple, Okada Rin 岡田麟, collected under the title *Honzō kōmoku yakusetsu* 本草綱目譯說 (A Translation Explaining the *Ben cao gang mu*) all that he had transcribed in similar circumstances.¹⁸⁵ In 1784, Terao Takazumi 寺尾隆純 gathered together under the title *Honzō kōmoku kaishiki* 本草綱目會識 (Transcription of the Meetings on the *Ben cao gang mu*) the notes that he had taken during the series of lectures that Ranzan had delivered in the first month of the year 1784.¹⁸⁶ At the end of 1791, a certain Genku Ryū 源九龍, who was not himself a disciple, prepared a *Honzō kōmoku kibun* 本草綱目紀聞 (An Account of the *Ben cao gang mu*), which was a revision of the notes that he had taken during lectures given by the master. Similarly, in 1797, Kiuchi Masaaki 木内政章, a herbalist doctor who was a disciple of Ranzan, collected his own notes under the same title. However, none of these collections was published. The great fame of Ono Ranzan caused him

¹⁸⁴ Isono Naohide (2002, p. 220).

¹⁸⁵ Isono Naohide (2002, p. 342).

¹⁸⁶ Isono Naohide (2002, p. 361).

to be summoned to Edo in 1799, to teach at the College of Medicine (*Igakukan* 醫學館) of the Bakufu.¹⁸⁷ Here, too, it was the *Ben cao gang mu* that provided the subject matter for his teaching. An arrangement of the notes taken by disciples and by his grandson Ono Mototaka 小野職孝 (1774–1852) during those lectures led to the publication in Edo, between 1803 and 1805, of a book in forty-eight *kan*, *Honzō kōmoku keimō* 本草綱目啟蒙 (Clarifications for the *Ben cao gang mu*).¹⁸⁸ The plan of this work strictly follows that of the parts of the *Ben cao gang mu* that present *materia medica*. That is to say that the first four *juan* of the original work – which consist of a bibliography, therapeutic principles, and treatments for certain illnesses – are not taken into account and the first chapter of Ono Ranzan's book corresponds to the fifth *juan* of the *Ben cao gang mu*, which is the first that specifically addresses *materia medica*. We note that he makes the same choice here as did Inō Jakusui in the manuscript cited above. This text provides a precious document that illustrates the evolution of the methods of Japanese doctors where the *Ben cao gang mu* was concerned. Ono Ranzan, like Inō Jakusui, tried hard to identify all the products cited in the Chinese book. In the cases where he was unable to do so, he systematically indicates the fact with *mishō* 未詳 ('not identified'). The Japanese names given for the Chinese entries are in many cases localised, thereby indicating the Japanese region of the provenance of the corresponding minerals, plants and animals. This precise identification of the Chinese names of *materia medica*, which was fundamental for correct medicinal usage, thus appears at the same time to be a kind of inventory of the resources in Japan in this domain. However, unlike Jakusui, Ranzan systematically suggested detailed descriptions for each of the natural objects that provided *materia medica*. His work thus appears to be as much a text that brings up to date the naturalist part of the *Ben cao gang mu* as a (non-illustrated) medicinal flora and fauna of Japan. No doubt one great difference between the methods of Ranzan and those of his predecessors is the nature of their works of reference. As we have seen, for Ekiken and for Jakusui, the sources that they used were Chinese. Although Ranzan does use those same documents, he also turns to the books written in Dutch that were available in Japan.¹⁸⁹ In certain cases of imported products, he indicates the Dutch names and the item's provenance.¹⁹⁰ In this way, Ranzan, setting out with pharmacological aims, achieved the true work of a naturalist, the value of which was undeniable. As the founder of chemistry teaching in Japan, the Dutch A. J. C. Geerts,¹⁹¹ pointed out, his book made it possible to establish a bridge between the natural products of China and of Japan. The scientific value of his work also made it an irreplaceable tool for Alexander von Siebold in his studies on the flora and fauna of Japan. He certainly acknowledged his debt to the work of Ono Ranzan, whom he

¹⁸⁷ Endō Shōji (2003, p. 113), Isono Naohide (2002, p. 408).

¹⁸⁸ The plates of engravings from this first edition were unfortunately destroyed in the great Edo fire in the third month of the following year. Ono Mototaka immediately set about preparing new plates for a new edition, which began to appear in 1811. See Isono Naohide (2002, pp. 438, 440, 461).

¹⁸⁹ On the Western books imported into Japan during the Edo period, see Matsuda Kiyoshi (1998).

¹⁹⁰ See Endō Shōji (2003, pp. 118–19). ¹⁹¹ Geerts (1878, p. 23).

dubbed the 'Linnaeus of Japan'.¹⁹² As Kimura Yōjirō 木村陽二郎 has remarked, a number of factors combined to favour the work of Ranzan.¹⁹³ Certainly the first was his own scientific mind, which is evident from a reading of his texts. The second is that he had access to all the documents preserved in the shogunal library, in particular a manuscript of the *Shobutsu ruisan*. His third advantage was that the students who surrounded him came from all the regions of Japan and brought him the plants and minerals that they found there. Finally, his official job made it possible for him to make five plant-collecting expeditions. A point that needs to be emphasised and that seems further to confirm my original hypothesis about the crucial role played by the *Ben cao gang mu* in the formation of modern natural history in Japan is the nature of the very contents of the book by Ono Ranzan. Just as Inō Jakusui was interested solely in the nomenclature and the description of the plants, animals and minerals that provided *materia medica*, Ranzan concentrates solely on the non-medical parts of the original Chinese work. Not content simply to explain and identify these products, he also tries hard to indicate the possible substitutes that the Japanese environment sometimes produced.

Another work that he managed to complete, the *Ka.i* 花彙 (1765) (Catalogue of Flowers), in eight fascicules, devotes one half to herbaceous plants and the other to ligneous plants, and it makes us appreciate still more his approach to the Japanese environment. This text, the first two fascicules of which were composed by another naturalist, Shimada Mitsufusa 島田充房 (Yonan 雍南), also a disciple of Matsuoka Joan, is totally detached from *materia medica*.¹⁹⁴ The comments of this author in the preface to the edition of the first two fascicules in 1759 throw considerable light on the methods of these naturalist literati, in particular regarding their literary heritage:

What is the *Ka.i*? It is a work designed to transmit the form of plants. Despite the great number of books that have existed since antiquity and contain illustrations of flowers, in many cases it is very difficult to identify a plant correctly from those images. Ever since my childhood, I have loved plants both terrestrial and aquatic. I have roamed over the mountains, explored the rivers and the seas. The plants growing close by I planted in the family garden; those that grow far away I drew, so as to keep them in this way. I continued doing this for many years. Because of the imprecision of the images in books, it was not possible to identify them precisely. So, when I had the time, I described them, endeavouring to be clear, so that it would be possible always to recognise them upon seeing them, despite the differences that stemmed from the conditions of the soil and climate. To decide on their correct names, I scrupulously followed the advice of apothecaries (*honzōka* 本草家) without adding anything. Those who share my tastes, scouring mountains and valleys in search of plants, no longer need to remain undecided if they take my pictures with them [see Fig. 182].¹⁹⁵

¹⁹² Geerts (1878, p. 23). ¹⁹³ Kimura Yōjirō (1988, pp. 192–3).

¹⁹⁴ There exists a French translation of the text, see Savatier (1873).

¹⁹⁵ Ono Ranzan and Shimada Mitsufusa (1977, pp. 6–8). English version of author's French translation.



Fig. 182. *Sarutoribara* 木猪苓 (*Smilax china* L.), from *Ka.i* 花囊 (1759–65, *mu zhi* 3) by Shimada Mitsufusa and Ono Ranzan. Cf. Fig. 184 below.

If I evoke this work at this point, it is because it explicitly confirms the inadequacy of the ancient texts, in particular the Chinese ones, when it comes to precise representations of natural objects. It is also because this is perhaps the first illustration of a switch from regarding the Japanese environment with an eye biased by the Chinese texts to an apprehension of natural objects that is instead direct, even if the observer does then return to the Chinese and Japanese sources in order to choose the nomenclature that he judges to be 'correct'. It is worth noting that that last sentence cited clearly shows that, for its original author, the book's function is that of a work of reference for the identification of plants encountered in the course of a botanising expedition. Even if it is not possible to speak, in this connection, of a true flora, since the reader is provided with no key for his research, this work nevertheless is a kind of reference catalogue with a practical purpose.

Despite their differences, the three methodical systems for making use of the *Bencao gangmu* that have been described above do manifest a remarkable unity when one considers their authors. All three naturalist doctors belonged to the same social circle, that of literati from the military class, working in the service of local lords.

They also shared an intellectual background. They had all had a classical Confucian education, completed by medical knowledge dominated by Chinese sources. This implied paying great attention to the 'correct naming of things'. They were, furthermore, linked by an intellectual filiation: Inō Jakusui, a friend and disciple of Kaibara Ekiken, had his work carried on by his disciple Niwa Shōhaku; another of his disciples, Matsuoka Joan was the teacher of Ono Ranzan.

The many further editions of the Chinese text, complete with Japanese reading signs, testify to the importance ascribed to the *Ben cao gang mu*, as a work on medicine. The point of making it easier to read was to enable the literate Japanese public to benefit from the knowledge amassed in this voluminous text. To this end, the correct identification of products and their sources was essential. This seemingly philological way of proceeding relied also on fieldwork. It is certainly the quality of the achievements in both those domains that accounts for the value of the 'Clarifications' of Ono Ranzan. In this instance, the *Ben cao gang mu* was both the cause and the aim of the naturalist method. It was a matter of identifying natural objects but doing so using the right names; the researcher's eye moved from words to things. In the case of the *Yamato honzō*, you could say that the *Ben cao gang mu* provided a model and a reference work for a better understanding of the reality of the Japanese environment. Inō Jakusui, for his part, working in the pure tradition of the nominalist movement, *meibutsugaku*, endeavoured to provide Japanese equivalents for the Chinese names of *materia medica* and also for other natural products. As for Ono Ranzan, he achieved the same result but, furthermore, produced a detailed description of the *materia medica* and did not hesitate to turn to texts written in Flemish in order to fill in the gaps that remained in knowledge relating to exotic products.¹⁹⁶ However, even if these three authors were well aware of the difference from the Chinese environment, the fact remains that, for the Japanese scholars of the early 19th century, the corpus formed by the Chinese texts and the *Ben cao gang mu* in particular contained a mass of information judged to be essential for any understanding of the diversity of the reality of Japan, even if Western knowledge was also regarded with great interest within the framework of 'Dutch studies', *Rangaku*. In this connection, let me now record two citations from the prefaces to the Japanese translation of the *Cruydt-Boeck* by the Flemish doctor, Rembert Dodoens (1517–85).¹⁹⁷ Noting that the original text was a synthesis of Western knowledge, Ōtsuki Gentaku 大槻玄沢 (1757–1827), a doctor and scholar in 'Dutch studies', nevertheless stated in 1823 that the translation had been enriched thanks to

¹⁹⁶ Although Ono Ranzan uses a precise terminology in the great majority of these descriptions, they cannot be said to be true diagnoses, since he still sometimes resorts to analogy, for instance to describe the shape of a particular leaf.

¹⁹⁷ The first Flemish edition dates from 1554. In view of the great success of the work, its publisher in Antwerp, Jean Loë, published a French translation by Charles de l'Écluse (Carolus Clusius), with the title *Histoire des plantes, en laquelle est contenue la description entière des herbes, c'est à dire leurs Espèces, Forme, Noms, Tempérament, Vertus & Opérations: non seulement celles qui croissant en ce pays, mais aussi des autres étrangères qui viennent en usage de médecine* ... On the importance of this book in Japan, see Vande Walle and Kasaya (2001) and, in this collection, the articles by Matsuda Kiyoshi and Shirahata Yōzaburō in particular.

the *Ben cao gang mu* (1596) and so ‘the products of the West, making up for what was lacking in Japan and China, added to the medical art, for the welfare of the people’,¹⁹⁸ while Kurimoto Masayoshi 栗本昌臧 (1756–1834) declared in 1827 that ‘any fledgling student should have Chinese studies for a body and Western studies for wings’.¹⁹⁹

In conclusion, throughout the historical process of the importation of Chinese texts concerning natural objects – *materia medica*, edible and ornamental plants – one constant feature is manifest in the writings of scholarly Japanese doctors: the Chinese text does appear as the reference par excellence for knowledge but nevertheless is perceived as foreign knowledge that needs to be confronted with the reality of Japanese nature. In this respect, the *Ben cao gang mu* is a particularly enlightening example. The very structure of the book draws a clear distinction between the naturalist aspect – which corresponds to what Li Shizhen calls ‘the investigation of things’ (*ge wu zhi xue* 各物之學) – and the purely medicinal content.²⁰⁰ The Japanese doctors who practised Chinese medicine, having received a Confucian education, by definition knew classical Chinese and therefore had direct access to the medicinal texts. The problem lay with the recognition and identification of the products mentioned in the original text: hence the considerable labour of investigating that collection of knowledge that Ono Ranzan undertook in order to produce his ‘Clarification of the *Ben cao gang mu*’, which is not a translation but rather an adaptation of the naturalist part of the Chinese text to the Japanese environment. The purely medical part clearly did not need to be translated. Another illustration of the Japanese method is provided by the *Shobutusu rui san*. This was not simply a compilation of Chinese texts dealing with natural objects classified in accordance with the usual categories. For each Chinese name that appeared as an entry, Chinese synonyms were indicated – along with the reference text – and also, wherever they existed, the Japanese names, in *man’yo gana*, always accompanied by their geographical locale. This testifies to the results achieved by the lengthy work of investigation into Chinese sources ever since the 10th century. It certainly involved scholarly work on the texts, and therefore primarily on the names of Chinese *materia medica*, but that research was then closely linked with fieldwork among the inhabitants of villages both in the mountains and on the coasts.

The influence of Chinese texts relating to plants also played a noticeable role in the formation of modern botanic terminology. The first Japanese scholars who took an interest in scientific botany through the discovery of Western texts generally wrote their texts in Japanese (*bungo*), as in the case of the *Shokugaku keigen* 植學啓原 (1834) by Udagawa Yōan 宇田川榕菴 and the *Taisei honzō meisō* 泰西本草名疏 (1829) by Itō Keisuke 伊藤圭介 (1803–1901). Both these authors and also those who

¹⁹⁸ Sugimoto Tsutomu (1997–8, Volume 1, pp. 238–9).

¹⁹⁹ Sugimoto Tsutomu (1997–8, Volume 1, p. 230). The facsimile translation was edited by Sugimoto Tsutomu (1997–8). For a Western-language glimpse of the history of this translation, see Métailié (2004).

²⁰⁰ On this point, see Métailié (2001a).

followed them, with very few exceptions, systematically created new technical terms with the help of Chinese characters. This new terminology, then, officially recognised by the Ministry of Japanese Culture in 1874 when the English–Japanese dictionary composed by Ono Motoyoshi 小野職懿, *Shokugaku yakusen* 植學譯筌, was published, in the early years of the 20th century, passed on into China, where it considerably enriched the Chinese terminology that was at that time being elaborated.²⁰¹

(iii) *The discovery of Chinese flora by westerners*

The framework within which various European countries acquired knowledge about Chinese plants was clearly radically different from that described in the last section. At first, no linguistic knowledge accompanied the arrival of plant products, which were commercial items, and virtually nothing was known of the geographical and cultural reality of China. Instead of a relative homogeneity based on the acquisition of knowledge linked to *materia medica*, sources and modes of knowledge were more diversified. For a long time, no text seemed needed and discoveries were made through visual experience or hearsay. The first European witness known to us was Marco Polo, who spent time in China during the second half of the 13th century. However, before his account, the earliest information about Chinese plants was to be found in Arabic texts. The explanation for this is the existence of ancient maritime and terrestrial relations, the exchange of embassies even before the 8th century,²⁰² and the presence of Arab merchants in Canton. A manuscript by an anonymous author dated 851, *ʿAlhbār aṣ-ṣīn wa l-hind* (The Relation between China and India),²⁰³ contains the first correct mention by a foreigner of the use of tea as a beverage.²⁰⁴

The king receives in kind, as important sources of revenue, salt and a herb that they drink with hot water and which is sold for considerable sums in every town: they call it *sakh*.²⁰⁵ It has more leaves than a clover and is more fragrant but is bitter: they boil water and pour it onto the leaves. They use it for everything. Everything that enters the Treasury is made up of taxes, salt and this herb.

In the 10th century, apricot trees were cultivated around Bukhāra,²⁰⁶ and *The Book of Agriculture* by Ibn al-ʿAwwām which is about Muslim Andalusia in the 12th century, also devotes a chapter²⁰⁷ to the cultivation of this fruiting tree that was

²⁰¹ Métaillé (2001c). On the early history of contemporary botany in Japan and China, also consult Métaillé (2002; 1993; 1990; 1988; 1987; 1979), Shen Guowei (1997), Luo Guihuan (1987), Pan Jixing (1984).

²⁰² Hitti (1937, pp. 343–4). ²⁰³ Sauvaget (1946, p. 18). ²⁰⁴ Laufer (1919, p. 553).

²⁰⁵ The final consonant of the transcription does not correspond to any Chinese sound so it no doubt resulted from 'a mistake or faulty reading' (Sauvaget 1946, p. 60, n. 41).

²⁰⁶ Hitti (1937, p. 350).

²⁰⁷ Ibn al-ʿAwwām (2000, p. 257). The Romans already knew of the apricot tree at the beginning of our era, but it seems that it was not until the Muslim expansion that good varieties evolved in the western Mediterranean (Doré and Varoquaux 2006, p. 61).

native to China.²⁰⁸ There is also a note to the effect that among cultivated citron trees, there is 'the round citron' which, according to this text, is 'the size of an aubergine, and is acid even in its pulp and is called the citron of China'.²⁰⁹

As Emil Bretschneider notes, it seems strange that Marco Polo, who describes what he has seen in China in the late 13th century, never mentions tea. However, the fact that he was in contact with Mongols who drank milk in various forms might explain that absence.²¹⁰ On the other hand, the names of various plants and fruits of economic interest are mentioned in Marco Polo's text:²¹¹ sugar cane, grapes, enormous pears cultivated in Hangzhou – which Bretschneider assumes to be quinces rather than pears – ginger, galingale, giant bamboos, camphor trees, mulberry trees, and rhubarb, which has already been mentioned as an important export. Nevertheless, it was not until three centuries later that more reliable information about the plant products of China became available from Portuguese reports. It was in 1516 that the Portuguese arrived in China for the first time, having sailed there from Malacca. In 1517, their first official contact was made with the authorities of Canton, and they obtained the right to engage in trade. By 1537, there were three Portuguese settlements on the islands in the Gulf of the Canton river, one of which was Macao, which was to play a role of capital importance, then a trading centre was established in what is now Ningpo, and by 1544 there was also one settlement, or possibly two, in Fujian.²¹² As well as silk materials, gold, musk, pearls, precious stones, porcelain objects and sugar, a variety of plant products of a medicinal or edible nature were introduced into Europe, in particular orange trees. One tradition has it that it was Juano de Castro, the viceroy of India from 1545 to 1548, who sent a sweet orange seedling to Lisbon.²¹³ In truth, however, it seems that the sweet orange tree was known to the Portuguese before that date, for they must have come across such trees in their African colonies,²¹⁴ so it may well have been one century later that the tree was introduced directly from China.²¹⁵ The first author to produce precise information about a number of plant products from China that figured among the commercial goods that were traded in his day was Garcia da Orta (1499–1568). After studying medicine in Spain, he practised as a doctor from 1523 to 1526. From 1530 onward he taught natural philosophy at the University of Lisbon but, four years later, left his job there in order to travel to India as chief doctor to the Portuguese viceroy of India, in Goa. In 1563, he published *Colóquios dos simples e drogas da Índia* (Colloquia on the Simples and Drugs of India),

²⁰⁸ Li Fan confirms that the centre of origin was in the north, the north-west and the north-east of China, and in eastern Mongolia and Siberia.

²⁰⁹ Ibn al-'Awwâm (2000, p. 257).

²¹⁰ See Mote (1977, p. 205), who notes the importance of fresh or fermented mare's milk. See also Sabban (1986).

²¹¹ Bretschneider (1898b, pp. 2–5).

²¹² Bretschneider (1898b, p. 6).

²¹³ *Tian cheng* 甜橙, *Citrus sinensis* (L.) Osb.

²¹⁴ Mendes Ferrão (1992, p. 167).

²¹⁵ For a reminder of the history of the arrival of various *Citrus* in the West, see Volume 6, Part 1, pp. 363–7. On the Portuguese contribution to the diffusion of useful plants, see Mendes Ferrão (1992), in particular pp. 144–212, on plants originating from Asia. This author analyses (pp. 167–72) the various hypotheses concerning the arrival of the Chinese sweet orange in Portugal.

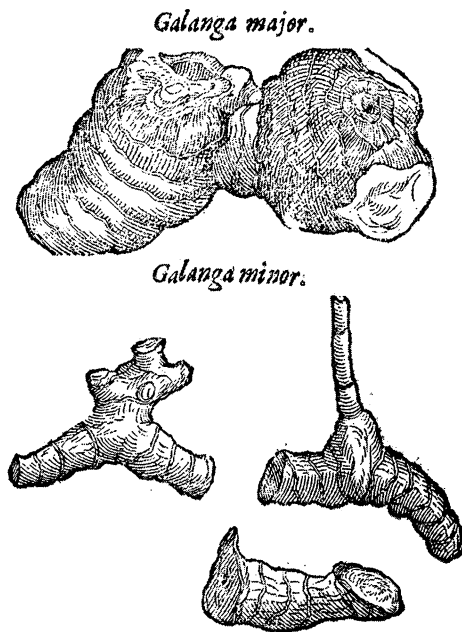


Fig. 183. Galangal, in *Rariorum Plantarum Historia* by Clusius (1601, Liber 1, p. 211).

a work composed of fifty-nine sections in the form of conversations, the colloquia of the title, most of which he engaged in with a doctor friend by the name of Ruano, on the subject of a variety of medicinal products to be found in India, some of which had come from China. Thus in the twenty-fourth conversation he spoke of the Chinese lesser galanga,²¹⁶ which, he said, was known in China as *lavandou* and which he was the first to distinguish²¹⁷ from the regular galanga (Fig. 183).²¹⁸ Similarly, in the twelfth conversation he explained the difference between the Chinese camphor and the camphor from Borneo. His writings inspired the great European vogue for the ‘China root’²¹⁹ (Fig. 184a, b) that came to be considered the prime remedy in particular for various cutaneous infections and the ulcers of venereal diseases, as Li Shizhen also claims.²²⁰ The fashionable vogue enjoyed by the root after the emperor Charles v was cured of sciatica²²¹ was largely due to the fact that Carolus Clusius (1526–1609)²²² reproduced most of the contents of the Colloquia

²¹⁶ *Alpinia officinarum* Hance, *gao liang jiang* 高梁薑. ²¹⁷ Garcia da Orta (2004, p. 310, n. 1).

²¹⁸ *Alpinia galanga* (L.) Swartz., *da gao liang jiang* 大高梁薑.

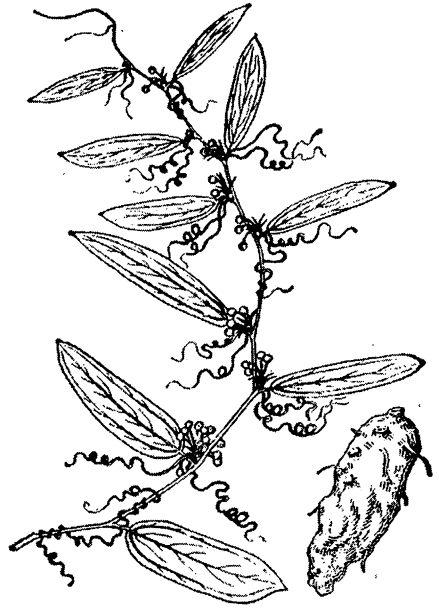
²¹⁹ *Smilax* sp. The correct name of the China root is *Smilax china* L., *ba qia* 菝葜, also known as chinaroot greenbrier, Chinese sarsaparilla. However, the plant described by Garcia da Orta in his 47th Colloquium is certainly *Smilax glabra* Roxb., *tu fu ling* 土茯苓, ‘and other species’, as Bretschneider (1898b, p. 8) puts it.

²²⁰ Li Shizhen (1975–81, Volume 2, pp. 1295–6). ²²¹ Matthioli (1627, p. 91).

²²² On Charles de l’Écluse, see Arber (1938, pp. 84–9); Egmond (2010).



菝 葜



土 茯 苓

Fig. 184. (a) Catbriar, 'China root' (*ba qia* 菝葜, *Smilax china* L.), from anon. (1977b, p. 1996, no 4113). Garcia da Orta likens it to a related species, *tu fu ling*; (b) *tu fu ling* 土茯苓 (*Smilax glabra* Roxb.), from anon. (1976a, p. 91, no 0166); (c) 'China root', 'China' in the German edition of Durante (1609, p. 237).

in a Latin translation and turned this into Book 7 of 'Exoticarum', a section appended to *Rariorum plantarum historia* (1601), duly acknowledging that this was a work written by Garcia da Orta. The 1633 edition of *The Herbal* by John Gerard (1545–1612),²²³ revised and completed by Thomas Johnson, also refers to this root, in Chapter 26 of his 'Appendix to the History of Plants', 'Of China and Bastard China', the text of which reproduces part of that of Garcia da Orta (Fig. 184c).²²⁴ Another important plant is rhubarb, 'to which a few words are devoted' in conversation 48. On the basis of the testimony of a number of writers, da Orta confirms that it comes from China 'by way of the province of Uzbek, which is a region of Tartary',²²⁵ but he admits that he himself has only seen it in a dried state and very imperfectly preserved (Fig. 185). The second direct European witness to go to China in the wake of Marco Polo and who left some notes relating to plants was probably a Spanish Augustinian monk, Martin de Rada (1533–78), who was sent there as an ambassador from the governor of the Philippines to the Emperor Wan

²²³ Arber (1938, pp. 129–33) gives 1607 as the date of his decease.

²²⁵ Garcia da Orta (2004, pp. 543–5).

²²⁴ Gerard (1975, pp. 1617–19).

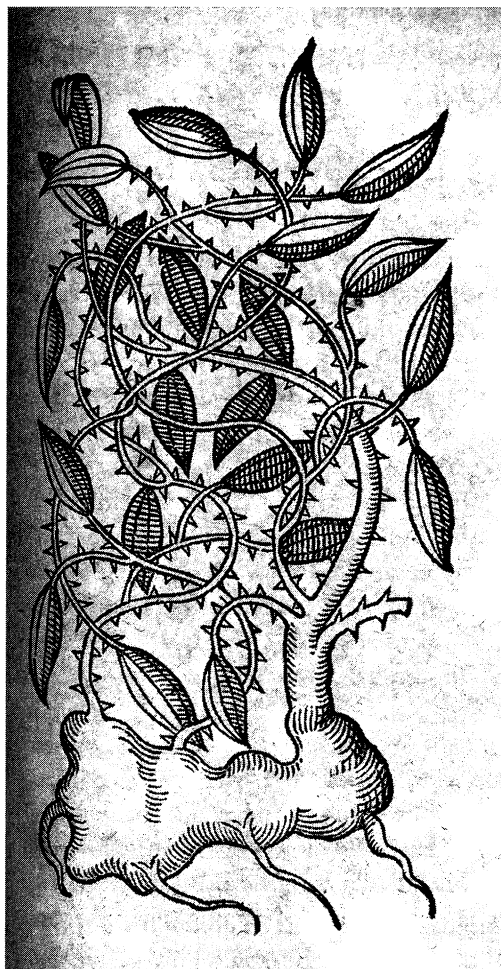


Fig. 184. (cont.)

Li in 1575.²²⁶ He was granted permission to stay for three months in the port of Quanzhou 泉州 in Fujian province.²²⁷ His experiences there are related by another monk of the same order, Juan Gonzales de Mendoza (1545–1618), in a text published in Rome in 1585, *Historia de las cosas más notables: ritos y costumbres del gran reino de la China*. Martin de Rada reports having seen chestnuts, large melons, ‘a kind of plum’ called *lecchias* (litchis) and various cereals: wheat, barley and millet, but strangely enough not rice but ‘the plant called *maize*, which constitutes the principal nourishment of the Indians in Mexico’. This remark, which attests to the presence of cultivated maize in 1575 in Fujian, is particularly interesting as it confirms what

²²⁶ Von Collani (2001, p. 339).

²²⁷ Bretschneider (1898b, p. 10).

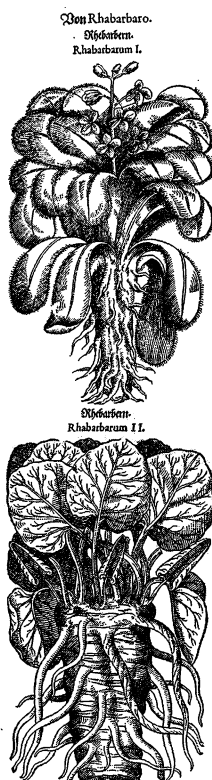


Fig. 185. Rhubarb in Tabermontanus (1613, p. 622).

we learn about the presence of maize in Zhejiang from the book by Tian Yiheng 田藝衡, cited above and published in 1573. This, then, seems to be the second mention of maize in China, before Li Shizhen's comments in the *Ben cao gang mu*, which appeared in 1596 but had been completed in 1578. Despite the proximity to the coast that would seem to suggest that this cultivated plant arrived by sea, the research of Cao Shuji 曹樹基 that I have mentioned above indicates that that was, in fact, not the case. The *Historiarum Indicarum Libri xvi* published in Florence in 1589 by the Jesuit Father Joannis Petri Maffei contains, on page 103, a short passage in which he records the information on China provided by other missionaries. He reports that there are pine woods and vines on the hills, while in the plains rice, barley and wheat are cultivated. Grapes, he says, are preserved, but are not pressed to make wine. On the other hand, he mentions a very healthy beverage made from a herb, 'called *chia*, that is drunk hot, as among the Japanese', and is excellent for one's health.²²⁸ Bretschneider thinks that this is the first mention of the Chinese

²²⁸ Bretschneider (1898b, p. 10).

term *cha* by a European. The next marker in the discovery of Chinese plants is the *Histoire de l'expédition chrétienne au royaume de la Chine 1582–1610* (History of the Christian Expedition to the Kingdom of China 1582–1610) by Matteo Ricci and Nicolas Trigault, a work written by Trigault in Latin in 1615, after Ricci's death, and published in Augsburg.²²⁹ Chapter III of Book I contains information about natural products provided by the author, who lives in Zhejiang. In his description of things in China, he sets out to make a note of 'whatever is unknown to our people'. There is another mention of tea, transcribed as *cian*; it explains that the Chinese throw away the leaves after drinking the infusion made from them, whereas 'the Japanese mix those pulverised leaves together in a goblet full of hot water, using two or three spoonfuls, and then drink the potion produced by this mixture'.²³⁰ He emphasises the abundance of cereals, 'wheat, barley, millet',²³¹ foxtail millet²³² and rice, which is 'almost their staple diet'.²³³ He notes that, in some provinces, vegetables,²³⁴ in particular 'phaseols',²³⁵ produce two or three harvests every year. He also notes the presence of nearly all the fruits known in Europe, except almond trees²³⁶ and olive trees, and adds that the fig trees planted by missionaries produce excellent fruit. Among the 'fruits that are very good to eat and are unknown to our people' he picks out litchis and longans, 'which grow only in southern provinces', 'the Indian nuts that come from the palm tree'²³⁷ and other fruits from India'. There are also kakis, which the Portuguese call 'Chinese figs' or, more commonly, 'basket figs' and which he recognises to be extremely tasty fruit,²³⁸ although they are surpassed by the quality of the oranges and lemons and 'all species of fruit from thorny plants'.²³⁹ He reports that in four southern provinces, betel and areca nuts are used and that 'every day they delight in eating this slightly piquant leaf, mixed with quicklime'. Although there is no olive oil, the oil derived from sesame has 'a good smell and abounds nearly everywhere'. On the subject of rhubarb, he reports that 'the Saracens of the west take it everywhere in Asia and also in Europe and make incredible profits, for here, where they obtain it, it costs very little'.²⁴⁰ Another medicinal plant that he cites is 'the famous remedy for several illnesses that the Portuguese call wood of China and others call holy wood, because it resembles the

²²⁹ There was to be the first French edition in the following year, in Lyon; see Christus (1978, p. 10).

²³⁰ Ricci and Trigault (1978, p. 83). ²³¹ *Panicum miliaceum* L. Beauv. ²³² *Setaria italica* (L.) Beauv.

²³³ Ricci and Trigault (1978, p. 76). If he did see maize, he was no doubt unable to identify it, as its cultivation in Europe was so rare. On the other hand, the Spanish monk Martin de Rada, who did not mention rice, did recognise maize, as he had already come across it in Mexico, where he had lived before leaving for the Philippines in 1564.

²³⁴ The term *légume*/'vegetable' should here be understood in its original etymological sense of *legumen*, the fruit of Leguminosae, for a little later it is to be found in a text of 'kitchen garden grasses', without any further details.

²³⁵ No doubt in the absence of beans (*Phaseolus vulgaris* L.) native to central America, which are mentioned for the first time in the *San nong ji* 三農紀 (1760) by Zhang Zongfa 張宗法 (see Li Changnian 1958, p. 327), this term must also designate various other Leguminosae, such as adzuki beans, soya, mung beans, etc.

²³⁶ See above, pp. 87–8. ²³⁷ These are coconuts. ²³⁸ Ricci and Trigault (1978, p. 77).

²³⁹ This vague expression must cover both jujubes and pomegranates.

²⁴⁰ This had already been noted by Odoric of Pordenone, a Franciscan monk who left Venice for Peking in 1296. He notes that Gansu 'abounds particularly in chestnuts and that rhubarb grows there in such profusion that you can buy as much as a donkey can carry for less than six groats'. See de Porquenone (n.d., pp. 76–7).



Fig. 186. 'Wood of China', *Smilax aspera* in the German edition of Durante (1609, p. 952). Cf. Fig. 192.

medicine that is brought from the new lands' (Fig. 186).²⁴¹ He also mentions 'a species of reed (the Portuguese call it bamboo) that is almost as hard as iron'.²⁴² As a wood to work with, he reports, having noticed that oak is very rare, that 'an eternal and very hard species makes up for that lack, and for this reason the Portuguese call it iron'.²⁴³ Finally, he reports that cedar, considered 'a funereal tree by the Chinese', is used to make coffins.²⁴⁴ The term 'cedar' should probably be understood to refer

²⁴¹ Ricci and Trigault (1978, p. 82). Here, Trigault is alluding not to guaiacum (*Guaiacum officinale* L., in Cauvet 1869, Volume 2, p. 239; Grieve 1978, pp. 380–1) but to the 'China root' (in this context *Smilax glabra*; see note 219), which had supplanted guaiacum, as Garcia da Orta (2004, pp. 526–8) reports in the 47th Colloquium. As for 'the kind that is brought from the new lands', this too is the root of a sarsaparilla, about which Matthioli (Matthiolus 1627, p. 92) comments as follows: 'In fact, the root that the Spaniards call ZARZA PARILLA is no less efficacious and remarkable than guaiacum and the China root'. It turns out that this plant was none other than *Smilax aspera* L., a species also found in Europe.

²⁴² Ricci and Trigault (1978, p. 81).

²⁴³ Bretschneider (1898b, p. 11) identifies it with Loureiro's *Baryxylum nufum*, one of the Fabaceae. The Chinese name that Loureiro gives (1790, p. 266), *Tiě lì mu* (*tie li mu*) corresponds to this taxon; that same name, 鐵力木, literally 'wood with the strength of iron', today also designates *Mesua ferrea* L., the rose chestnut (Fèvre and Métaillé 2005, p. 453).

²⁴⁴ Ricci and Trigault (1978, p. 81).

also to other trees that belong to the botanic genus *Cedrus*. The only indigenous species, *Cedrus deodara* (Roxb.) G. Don (*xue song* 雪松), grows in the western Himalayas.²⁴⁵ But here the cedar may be *Cunninghamia lanceolata* (Lamb) Hook. (*shan mu* 杉木), which has excellent wood that is fragrant and easy to work with, that does not splinter when it dries and is the most important working wood in China;²⁴⁶ however, Jean Baptiste du Halde (1674–1743), in his *Description of the Empire of China* (1735), relates that what is called ‘Chinese cedar’ in the ‘reports’ by foreigners is the *nan mu* 楠木.²⁴⁷

Johann Schreck (Terrenz, Terrentius, Terence) (1576–1630) was an exact contemporary of Nicolas Trigault and was present in China at the same time as him. Schreck, a brilliant doctor, had been received into Prince Federico Cesi’s Academia dei Lincei, in Rome, on 3 May 1611, six months prior to his decision to enter the Society of Jesus. It was at the request of the prince that he had collaborated, with notes and commentaries, in the Latin edition of a natural history of Mexico by Francisco Hernandez.²⁴⁸ In 1614, still in Rome, Father Trigault, who had returned to Europe in order to strengthen the mission in China, persuaded him that this country offered a fine opportunity for evangelisation based on scientific discoveries;²⁴⁹ accordingly, in 1616 they began to prepare together for this aspect of their mission, collecting funds, books and other material as they travelled through Belgium and Germany. On 16 or 17 April 1618, Father Trigault set sail for the east from Lisbon,²⁵⁰ taking with him Johann Schreck and a number of other missionaries. They arrived in Goa on 4 October of that same year and set off again on 15 May. On the eve of this departure, Schreck, in a letter to his friend Giovanni Faber, apothecary to the Pope in Rome, wrote that in the past four months he had been engaged in research on a number of natural things and had ‘found 500 plants, few fish, a number of stones, few snakes and not a single bird’, for they flew off as soon as he approached them.²⁵¹ As they then travelled in Bengal, Malacca, Sumatra and Indochina, he continued indefatigably with his observations of plants, animals, minerals and customs, with the aim of producing a book that he would entitle *Plinius Indicus*. The title appears to indicate a vast naturalist project, but the reference to the work of Pliny in the title should not obscure the crucial importance of the manuscripts of Francisco Hernandez concerning Mexico, which Schreck had been using ever since 1611, with a view to composing notes to accompany the publication that Cesi had commissioned from him. This was certainly the model that Schreck had in mind as he undertook his naturalist collections throughout the

²⁴⁵ Zheng Wanjun (1983, p. 256). ²⁴⁶ Zheng Wanjun (1983, pp. 308–10).

²⁴⁷ Du Halde (1735, Volume 1, p. 19). *Phoebe nanmu* (Oliv.) Gamble.

²⁴⁸ Entitled *Rerum medicarum Novae Hispaniae thesaurus seu Plantarum Animalium Mineralium Mexicanorum Historia* ... This work did not appear in Rome until 1651. The chapter ‘The Mexican Treasury’ in the book by David Freedberg (2002, pp. 245–74) gives a detailed account of the history of this publication. See also Gabrieli (1936a, pp. 471–5).

²⁴⁹ On the conditions of the Jesuits’ major contacts with Chinese literati, what was intellectually at stake and the historical framework, see Gernet (1982).

²⁵⁰ Gabrieli (1936a, p. 466). ²⁵¹ Gabrieli (1936a, p. 492).

journey and continued later, in China. When he arrived in Mac^{áo}, he had to wait a further two years before entering China, because of the persecutions that were taking place there. Not until 26 June 1621 did he reach Hangzhou,²⁵² where he remained for almost a year, confined to his residence, trying to get plants delivered to him there and learning their Chinese names. As he wrote on 22 April 1622, he planned to ‘discover their properties and their uses once he had learnt the language’.²⁵³ Already in the preceding year, in a letter dated 26 August 1621, written in Hangzhou and likewise addressed to his friend Giovanni Faber, he announced that he was busy studying Chinese.²⁵⁴ He was able to move to Peking in late 1623. He died there on 13 May 1630, leaving many Chinese translations of European scientific works, in particular on mechanics and astronomy, which he had produced with the help of a member of the literati who had become a convert, Wang Zheng 王徵. Many of his letters contain information relating to plants. In the one cited above, dated 26 August 1621, after recording many details about his travels, he wrote, ‘As for natural things, I have made no detailed observations as I am not permitted to go out. That is why I am so brief on the subject . . . The fruits resemble European ones, such as peaches, apricots, water melons, cucumbers and so on’.²⁵⁵ In another letter, again to his friend Giovanni Faber, written in Jiading and dated 22 April 1622, he explains,²⁵⁶

As yet I have done no research in the natural sciences. With our own men [the Jesuits] it is not possible [through lack of training no doubt]; with the Chinese I am prevented through ignorance of the language. I take care to have plants brought to me from the country from time to time in order that I may learn their names, but as yet I haven’t even a hundred. I will inform myself of their properties and their uses when I know the language.

He does mention a few plants, a passion flower, ‘granadiglia’, for instance, although he cannot be sure of it as he has noticed that Chinese plants are very different from those of the New World and also from those of India; however, he finds that alongside plants that are native to China, there are many that are also to be found from ?Europe. He writes,

I have discovered the plantain²⁵⁷ [Fig. 187], shepherd’s purse, sweet violets,²⁵⁸ [Fig. 188] chestnut trees, pear trees, walnut trees, hazelnut trees, and oak trees that I did not know of.²⁵⁹ An infinite number of plants are new to me; wherever I look about me, there are things to astonish me . . .²⁶⁰

²⁵² Willeke (1976). ²⁵³ Bernard (1941, p. 226). ²⁵⁴ Gabrieli (1936a, p. 495).

²⁵⁵ Gabrieli (1936a, p. 497). ²⁵⁶ Gabrieli (1936a, p. 507), translated by Bernard (1941, p. 226).

²⁵⁷ There are indeed several species of plantain in China, including *Plantago major* L., *da che qian* 大車前, which is very common in Europe too.

²⁵⁸ This term, taken over from Dioscorides, designates the fragrant *Viola odorata* L. (Duchesne 1836, p. 225), *xiang jin* 香堇.

²⁵⁹ We can understand that remark when we see that there are in China 110 species of the genus *Quercus*. See How Foon-Chew (1982, p. 408). The forty-four species that figure on pp. 439–62 in Volume 1 of the *Zhong guo gao deng zhi wu tu jian* (anon. 1972–6) flora give a good idea of the diversity of these Oaks.

²⁶⁰ Gabrieli (1936a, p. 503).

Le grand Plantain.



Fig. 187. Plantains, in Fuchs (1547, x1). The greater plantain, *Plantago major* L., strongly resembles a common Chinese plantain, *che qian* 車前 (*Plantago asiatica* L.). To appreciate this resemblance, see Figs. 46c and 53.

He cites a *Stramonium*, 'which in India we call *Duturo*, and, wrongly, in Garcia [da Orta], *Datura*.²⁶¹ It is the plant that Monsieur Henri²⁶² has in his garden, with white seeds and a round "apple". For oblong apples are never to be seen in the East'. This detail regarding the shape of the fruit confirms Gabrieli's identification of this plant as *Datura metel* L. (Fig. 189). He then lists various products useful in medical practice, some of which are sent to him although he does not always receive them: branches of *thus*, one of the incense trees,²⁶³ Ethiopian myrrh,²⁶⁴ costus,²⁶⁵ asa

²⁶¹ Garcia da Orta (1987, Volume 1, pp. 295–301).

²⁶² Enrico Corvino, a famous Roman apothecary of Dutch extraction, a friend of Faber and Cesi. See Gabrieli (1936a, p. 503, n.).

²⁶³ *Boswellia sacra* Flueck. = *B. undulato-crenata* Engler, mentioned by Gabrieli (1936a, p. 507, n. 6). This author explains that this is the Arabian species, which he distinguishes from that of Somalia *B. carteri* Birdwood. Those two binomes are nowadays synonymous with the first one.

²⁶⁴ This comes from three species of the *Commiphora* genus. Gabrieli (1936a, p. 507, n.).

²⁶⁵ *Saussurea lappa* (Decne.) C. B. Clark. Gabrieli (1936a, p. 507, n.). Also in Uphof (1968, p. 473).

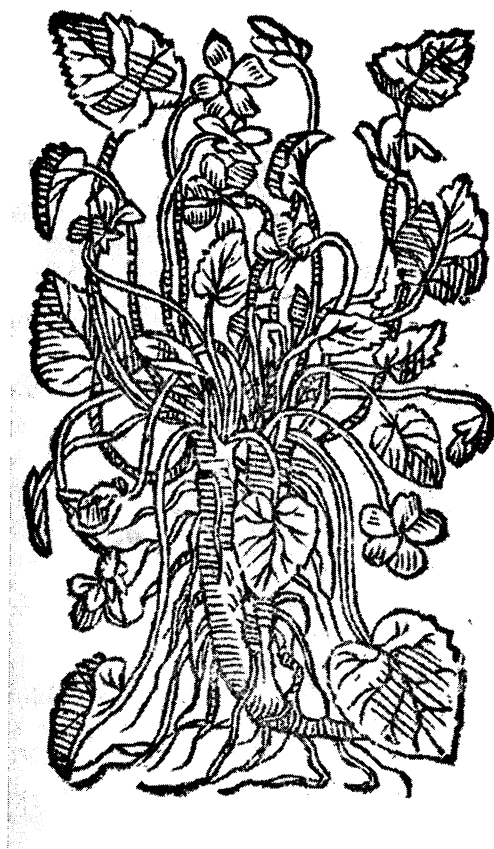
Violette de Mars.

Fig. 188. *Xiang jin* 香堇, 'sweet violet' (*Viola odorata* L.), from Matthiolus (1627, p. 431).

foetida,²⁶⁶ santal, aloe wood, *rhabarbarum*²⁶⁷ (which he has in his garden but which has not yet flowered),²⁶⁸ the camphor tree (which already has leaves and which he hopes will have flowers and fruits in the next year),²⁶⁹ zedoaria (white turmeric or zedoary),²⁷⁰ Indian zurumbet ('close to ginger'),²⁷¹ cubeba (which is very abundant

²⁶⁶ Gabrieli identifies it with *Ferula narthex* Boix, which according to Uphof (1968, p. 222) is the silphium 'of the Ancients', asa foetida being *Ferula assa-foetida* L., in Chinese *a wei* 阿魏.

²⁶⁷ *Rheum raphaniticum* L. (Gabrieli 1936a, p. 507). The fact that the plant grows in Schreck's garden and that at first he took it for a type of spinach confirms this identification. In Chinese *shi yong da huang* 食用大黃.

²⁶⁸ *Agularia agallocha* Roxb., in Chinese *chen xiang* 沉香.

²⁶⁹ *Cinnamomum camphora* L. Presl., in Chinese *zhang shu* 樟樹.

²⁷⁰ *Curcuma zedoaria* (Berg.) Rosc. In Chinese *e shu* 莪術. ²⁷¹ *Zingiber zerumbet* (L.) Smith, bitter ginger.

(a)

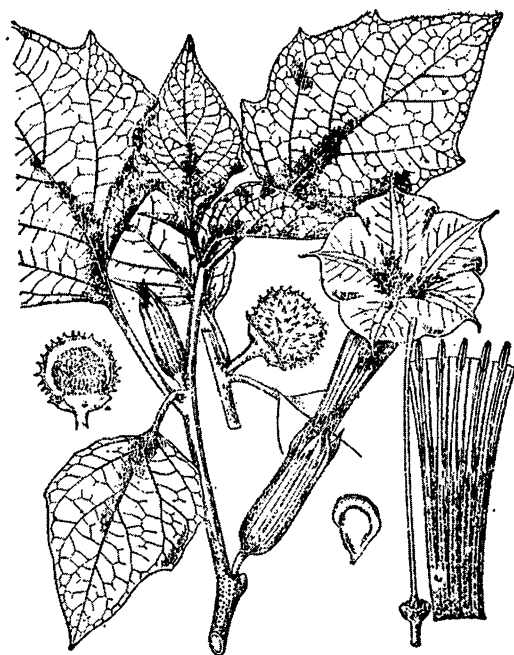


Fig. 189. *Datura metel* L.: (a) from anon. (1972-6, Volume 3, p. 729); (b) from Clusius (1601, *Exoticarum* Liber 9, p. 289).

in Java but which he has never seen in China),²⁷² benzoin,²⁷³ galanga²⁷⁴ (which is abundant in Macao and in India and resembles *cannacoro*²⁷⁵), and Indian shot. There remained a round red fruit, as large as a *moscatus* nut,²⁷⁶ the interior of which is divided into three, as in asphodels, with seeds that taste of cardomum,²⁷⁷ of which he has 'a picture, but nobody to copy it'. The description suggests *cao guo* 草果 (Fig. 190).²⁷⁸ Finally, he mentions a daily summer food, the lotus,²⁷⁹ the 'bean of Egypt', a relation of the water lily, the flower of which is exactly similar although its fruit is exactly like a bean and perfectly fits the description given by

²⁷² *Piper cubeba* L., in Chinese *bi cheng qie* 萆澄茄. ²⁷³ *Syrax benzoin* Dryander, in Chinese *an xi xiang* 安息香.

²⁷⁴ *Alpinia officinarum* Hance, in Chinese *gao liang jiang* 高良薑.

²⁷⁵ *Canna orientalis* Roscoe. This binome is today synonymous with *Canna indica* L., in Chinese *mei ren jiao* 美人蕉.

²⁷⁶ *Myristica fragrans* Houtt., in Chinese *rou dou kou* 肉豆蔻.

²⁷⁷ *Elettaria cardamomum* White and Maton, in Chinese *xiao dou kou* 小豆蔻.

²⁷⁸ *Anomum tsao-ko* Crevost and Lem.; anon. (1977b, Fig. 3284).

²⁷⁹ *Nelumbo nucifera* Gaertn. *Lian* 蓮. At this point Schreck notes one of the features of Hangzhou cooking, namely the importance of aquatic vegetables. Together with lotus rhizomes (*lian ou* 蓮藕) prepared in a variety of ways, people consume delicious soups made with the young leaves of water shield, *Brasenia schreberi* J. F. Gmel, *chun cai* 蓴菜.

(b)



Fig. 189. (cont.)

Theophrastus.²⁸⁰ He then reports that, for cautery,²⁸¹ the Chinese use a tiny portion of *Absinthus*, artemisia.²⁸² These few examples, together with his complement to the work on the natural history of Mexico, give a good idea of Schreck's approach. He was a doctor well informed about *materia medica*, and a scrupulous observer, both erudite and curious. It is much to be regretted that the work that he announced, his *Plinius Indicus*, is today no longer accessible, the more so because the note about him in the *Sheng jiao xin zheng* 聖教信証 (Truths and Evidence Provided by Holy Religion) (c.1680)²⁸³ tells us that

²⁸⁰ Gabrieli (1936a, p. 509). For a translation of the passage from Theophrastus, Book iv, viii. 6–7, see Theophrastus, Loeb Classical Library.

²⁸¹ These are moxas.

²⁸² Gabrieli (1936a) for the use of moxas. Gabrieli refers to Kaempfer's book on Japan, *Amoenitatum Exoticarum, Politico-physico-medicearum fasciculi v*, 1712, p. 589, para. 3e ff. The moxas (ai rong 艾絨) are composed of dry artemisia leaves, in particular Chinese mugwort (ai 艾) *Artemisia argyi* Lévl. et Vant.

²⁸³ Dudink (2001a, p. 587). The work of two Chinese converts, Han Lin (1601–44) and Zhang Geng (1685–1760). For the text of the citation, see Han Lin and Zhang Geng (2000, p. 21).

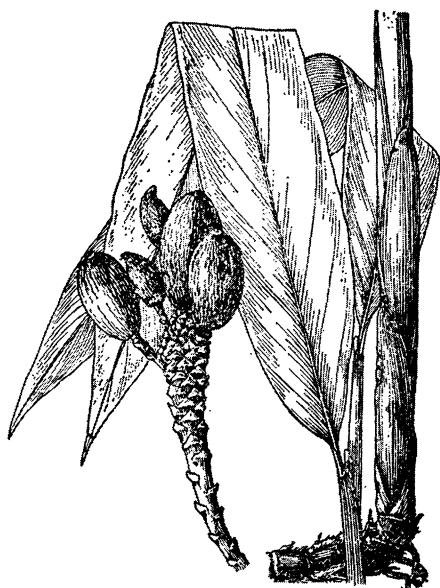


Fig. 190. *Cao guo* 草果 (*Amomum tsao-ge* Crevost et Lem.), from anon. (1977b, p. 1575, no 3284).

Deng Yuhua 鄧玉函 [Terrentius, Johann Schreck], personal name Hanpu 涵璞, a native of Germany, came to China and began to preach religion in the first year of the Tian-chhi period [in 1621] . . . Then he went to the capital to help in the calendar office. He was an excellent doctor who carefully examined and studied over 8,000 Chinese natural objects.²⁸⁴ Sadly, this herbal has not been translated . . .

Indeed, this work in two folio volumes, containing many illustrations by the hand of the author who described the fauna, flora and minerals that he had observed not only in China but also in the course of his journey, never has been published. According to what Gabrieli tells us, on the strength of the report of a witness,²⁸⁵ the manuscript, written in Latin, still existed around the mid-19th century, in the Jesuits' Library of the Roman College, where, however, it is no longer to be found; furthermore we know of no accurate description of it. The information about it supplied in *La China Illustrata* (1667) by Athanasius Kircher, who claims to have seen it in Rome, appears really to be second-hand. However, in the first volume of *Memories . . . by the Missionaries of Pé-kin* there is a reference to the 'Herbal of Father

²⁸⁴ Original text: *ge jiu Zhong guo ben cao ba qian yu zhong* 格究中國本草八千餘種. See Han Lin and Zhang Geng (2000, p. 21). Below, I justify the translation of *ben cao* as 'natural object'.

²⁸⁵ Gabrieli (1936a, p. 484) bases his opinion upon the evidence of a certain Father PIANCIANI.

Terence', which is clearly distinguished from the 'Chinese Herbal', the *Ben cao gang mu*.²⁸⁶ In substance, the work, illustrated from nature, presented the results of observations that Schreck had noted down on the subject of animals, plants, minerals and also human institutions and customs, in the course of his voyages along the coasts of India, Bengal, Malacca, Sumatra and Cochinchina, as well as in Macao and China.²⁸⁷ We can only regret the disappearance of this work that must have reflected a particularly competent look at the natural environment of, in particular, China. If the information recorded in his biography, cited above, is correct, the inventory of 8,000 kinds of natural product was by far the most important ever produced up until this time, for we should remember that the *Ben cao gang mu* contained no more than just over 1,800 entries. It cannot have been a matter simply of products of *materia medica*: the excellent monograph *Zhong yao da ci dian* 中藥大辭典,²⁸⁸ published in 1977, which is very extensive, lists 4,773 plants, 740 animal products and eighty-two products of mineral origin.²⁸⁹ It is reasonable to assume that in this context, *ben cao* designates 'natural objects', plants, animals and minerals, rather than *materia medica*, and certainly not works on *materia medica*, also called *ben cao*, the number of which in this period amounted to no more than 100, as can be seen from the bibliography included at the start of the *Ben cao gang mu*.²⁹⁰

Two years after Schreck's arrival in Peking, a Spanish Jesuit, Adriano de las Cortes (1580–1629), found himself accidentally in China. He had been shipwrecked on the coast of what is now the province of Guangdong, close to Zhaozhou, on

²⁸⁶ Anon. (1776–91, Volume 14, p. 440).

²⁸⁷ According to the passage in Kircher (1979, pp. 110–11) repeated pp. 485–6, in Gabrieli (1936a).

²⁸⁸ See anon. (1977b). ²⁸⁹ See anon. (1977b, p. iv).

²⁹⁰ We should consider another question concerning the work of Johann Schreck. Isaia Iannaccone (1998, pp. 110 f.) has produced two hypotheses: (1) *Plinius indicus* might be simply a manuscript and illustrated copy of the *Ben cao gang mu*, a new edition of which, published in 1640, was in preparation in Hangzhou; and (2) this 1640 edition might somehow or other have been influenced by Schreck because he had lived and worked in Hangzhou, where he might have entered into relations, directly or through the intermediary of his Chinese collaborators, with the authors or the publisher of the illustrated supplement to the *Ben cao gang mu*. In that case, the many innovations in this edition might be ascribed to him. In the first place, we should remember that Johann Schreck left Hangzhou in 1623 (Collani n.d., p. 2), in order to take up important functions in Peking, where he died in 1630. He began to learn Chinese when he arrived in Macao in 1619 and, although he declares in his letters that he worked at this study in Hangzhou, he nevertheless writes on 22 April 1622 that he will learn of the properties and uses of a number of plants that he has been able to procure 'once he knows the language'. This suggests that he was not fully in command of the Chinese language at that date. So the first hypothesis does not really seem plausible to me and appears, rather, to stem from an erroneous interpretation of the *Plinius indicus*, which will be studied in connection with Father d'Incarville. Moreover, quite apart from the eighteen years that separate Schreck's departure from Hangzhou and the publication of the new edition of the *Ben cao gang mu*, my objection to the second hypothesis is based on both a general impression and also a specific case. Although the illustrations are, on the whole, better than those in earlier editions, they bear very little relation to the iconography of European works of the same period. It seems likely that, if Johann Schreck had intervened, he would have introduced definite differences to both the style and the details of the botanical representations and, in particular – and here lies the specific case – he, who had revised Hernandez's work on Mexico (Freedberg 2002, pp. 257–61), would not have been able to accept the mistaken representation of maize without making radical alterations to it (Fig. 191a, b).

16 February 1625, whilst sailing from Manila to Macao, and was then forced to spend 'one year and seven days' in China before leaving from Canton. After his return to the Philippines he composed a text in two parts.²⁹¹ The title, *First Part of the Account of the Voyage, Shipwreck and Captivity That He Endured along with Other Persons in Chauceo* [Chaozhou], *the Kingdom of Great China, and What He Saw in the Course of His Journey*, sums up the work's contents very effectively. The reader learns of the circumstances of the shipwreck (Chapter 1) and what followed once the survivors fell into the hands of the Chinese authorities (Chapters 2–14 and 24–9) up until their liberation (Chapters 31 and 32). But as early as Chapter 4, the author takes the decision also to give an account of life in China, as he witnesses it. He turns out to be a very subtle observer who records many details, on the culture of the country, its organisation and its social practices; the functioning of justice and punishment are particularly well documented. The work also includes monographs, most of which appear to be based on first-hand observation, such as Chapters 16, 'On the Meats and Fish of China'; 17, 'On the Fruits Produced in China'; and 18, 'On the Vegetable Garden Plants, Wines, Vinegar, Oil, Olives and Wax That Can Be Found in China'.

Below follow the fruits that he mentions,²⁹² bearing in mind that during his year of detention he went, mostly on foot, from Zhaozhou to Canton and that he knew no Chinese. He begins by listing 'those that are similar to those in Spain': excellent types of apple, two very tasty kinds of pear, clingstone peaches,²⁹³ walnuts, chestnuts, bayberries,²⁹⁴ plums, and jujubes 'as big as the common plums of Spain, which the people dry'. He also saw pomegranates and figs 'as delicious as those of Portugal' and 'a few climbing grapevines'. There were also watermelons, entirely yellow carrots, citrons, lemons, limes and several varieties of orange, some bitter, others sweet and yet others that were sweet-sour. And there were melons, 'but they are not as excellent as those of Spain. These are small melons, long and with a green skin and flesh that is green in some cases and white in others, floury, without consistency and tasteless. If they are eaten while still green as the Chinese do, they can substitute for good cucumbers'.²⁹⁵ As for fruits peculiar to China, he writes, 'I found fewer species and varieties than I hoped for'. First he cites 'those particular oranges that they call "oranges for mandarins"',²⁹⁶ then he says, 'there are others too, far better and that can very well be eaten together with their rind',²⁹⁷ and yet other large oranges that they call "Chinese oranges" and that are as large as a man's head and, in certain cases, as large as a good common pumpkin'; some of the latter

²⁹¹ Girard (2001).

²⁹² Girard (2001, pp. 214–17).

²⁹³ These are clingstone peaches.

²⁹⁴ These are Chinese bayberry *Myrica nura* (Lour.) Sieb. et Zucc., *yang mei* 楊梅 in Chinese.

²⁹⁵ These may be varieties of *Cucumis melo* L., var. *conomon* Mak. *cai gua* 菜瓜 (see anon. (1974a, pp. 271–6)) or varieties of *Luffa cylindrica* Roem. *si gua* 絲瓜 (*idem*, pp. 268–70).

²⁹⁶ Certainly the king orange tree *Citrus reticulata* Blanco (= *nobilis* Lour.). Loureiro (1790, p. 466) certainly indicates that it is the best of all citrus fruits: 'Est Citrorum omnium gratissima'.

²⁹⁷ Probably varieties of kumquats, *Fortunella* sp. (*jin ju* 金桔).

have white flesh, others red, and their rind is like that of citrons. 'They are quite excellent and have a slight tang of grapes'.²⁹⁸ There are many other oranges too, 'small, sweet, with very thin rind, which are the best of all and must be the most delicious in the world'. He also cites the litchi, 'another fruit that is one of the best', and *chiqueyes*, which are 'excellent when they are ripe and are just as good as or even better than our Spanish figs when they are dried'.²⁹⁹ This list of truly Chinese products ends with the *lurgan*³⁰⁰ and the *vinas*, which is not identifiable. The third category is that of fruits he observed 'that are common to many regions of India and were no doubt brought in by trading with Spaniards, such as pineapples, 'very stunted' bananas and *lindines*.³⁰¹ He notices a great abundance of *piles*, 'a fruit that is somewhere between a pine-kernel and an almond and resembles both in its shape and taste'.³⁰² He records that in Macao he has seen *nancas*,³⁰³ 'a fruit from the Philippines that is very good, with firm, yellow flesh that is very tasty and fragrant. Their many pips . . . once grilled, taste like chestnuts, and their green rind carries many thorns, like a hedgehog'. This fruit from the bread tree may be two hand-spans in length and 'as wide as a round jar'. Still in Macao, he noticed *tamiboyes* (also known as *jambos*),³⁰⁴ mangoes, papayas and guavas. Finally, there may not be coconuts in continental China, but he has noticed them arriving by boat from Hainan.

As for vegetable garden plants,

the Chinese have good radishes and some that are very large and somewhere between a turnip and a radish, or that they try to pass off as radish when it is really turnip,³⁰⁵ garlic . . . onions that are very small and shrivelled, hardly as big as walnuts, leeks,³⁰⁶ lots of mustard, chard, purslane, large red marrows,³⁰⁷ others that are long and white³⁰⁸ and yet others that resemble them but are larger, with a greenish colour, which they call *candol*,³⁰⁹ very

²⁹⁸ This remark initially suggests *pu tao you* 葡萄柚, *Citrus paradisi* Macf., the pomelo, the juice of which is reminiscent of the taste of grape juice. Cf Yu Dejun (1982, pp. 286–7). However, the size of the fruit is far smaller than the author indicates, so it is more likely to be a grapefruit *Citrus maxima* (Burman) Merrill (= *C. grandis* (L.) Osbeck). On the problems of the nomenclature for grapefruit/pomelo, see Chauvet (1980).

²⁹⁹ These are kakis. ³⁰⁰ These are longans, *long yan* 龍眼, *Euphoria longan* (Mour.) Steud.

³⁰¹ These may be carambolas (*Averrhoa carambola* Linn., For a picture see Harrison et al. (1982, p. 103). See Girard (2001, p. 494).

³⁰² The taste closely resembles that of the kernel of the Chinese olive, *Canarium album* (Lour.) Raeusch., *gan lan* 橄欖.

³⁰³ Fruit of the jack tree, *Artocarpus integrifolia*, called *naca* or *nanha* in Indonesia, according to Girard (2001, p. 495, n. 5).

³⁰⁴ Fruit of the rose-apple tree, *Syzygium jambos* (L.) Alston = *Eugenia jambos* L., in Chinese *pu tao* 葡桃.

³⁰⁵ These are daikons, Chinese radish *Raphanus sativus* L., a considerable number of cultivars of which exist in both China and Japan. In Chinese *luo bo* 蘿蔔. 'Daikon' is borrowed from the Japanese word, the literal meaning of which is 'big root'.

³⁰⁶ This is certainly the spring onion *Allium fistulosum* L., *cong* 蔥, which closely resembles a leek (which did not then exist in China).

³⁰⁷ Possibly *Cucurbita moschata* Dutch, which becomes reddish-brown when ripe. See anon. (1974a, pp. 285–9).

³⁰⁸ These could be varieties of the bottle gourd *Lagenaria siceraria* (Molina) Standl., such as the *caugourda* Hara variety, *chang jing hu lu* 長頸葫蘆, which is a pale green colour and, as its name indicates, has a 'long neck'. See anon. (1974a, p. 277).

³⁰⁹ Possibly *Benincasa hispida* Cogn., the wax gourd *dong gua* 冬瓜.

good ordinary cucumbers and others that are long, with sharp prickles, which they call *margosos*,³¹⁰ which need to be cooked in two or three successive waters in order to remove their bitterness . . . There are others, without prickles, that also taste good and that they call *patolas*.³¹¹ There are aubergines, potatoes, sweet potatoes or *camotes*,³¹² as they call them here, red on the outside and with white flesh, and three or four species of the same family, called *gabes* or *ubes*,³¹³ etc. They also have three or four species of cow peas³¹⁴ and vegetables that are species of beans but are neither chick peas nor lentils nor Spanish carob beans, nor broad beans . . . I have also seen spinach, chards, mint, aniseed and coriander, but neither parsley nor saffron, which is replaced by a small yellow root that the Indians of the Philippines call *dilao*.³¹⁵ There is also an abundance of ginger, which is good, and a little cinnamon, but no cumin and no cloves, nor any nutmeg, nor pepper. In Macao, there is something that I have not seen in the interior of China: lettuces grow there, as do endives and a slightly more wild variety that they call *almirones*.³¹⁶ Betel is abundant and the Chinese consume large quantities of it throughout the day; they frequently use tobacco for smoking. In the town of Macao, they cook and eat a very good dish with a basis of tender reed hearts,³¹⁷ garlic, radishes, other vegetables and lemons preserved in vinegar.³¹⁸

He goes on to say that 'all the wine drunk in China is rice wine', that the edible oil is sesame oil and 'that which they use for lighting comes from bay trees, mustard seed and their medicinal wood that is so well known worldwide and that we call "Chinese wood"'.³¹⁹ They also make oil from the seeds of the castor oil plant'. Finally he notes that 'as they have no olive trees . . . they replace them with two wild bays . . . one is the *muy*,³²⁰ the other the *canaa*³²¹'. We can only regret that such a text

³¹⁰ Margose, balsam pear, *Momordica charantia* L., *ku gua* 苦瓜.

³¹¹ Luffa, vegetable sponge, towel gourd, *Luffa cylindrica* Roem. Tanaka (1976, p. 440) notes that *patola* is a Tagalog word meaning *Luffa acutangula* Roxb. The fruits of varieties of both species are eaten when young. Girard (2001, p. 495) suggests a different identification, but still a cucurbitaceae, *Trichosanthes anguina* L. This is the edible snake gourd, *she gua* 蛇瓜. It may be that the same term designates two different things in different countries; this seems to me all the more likely given that Tanaka (1976, p. 734) mentions a recipe for the snake gourd that is similar to that which he mentions (*ibid.*, p. 440) for luffas.

³¹² Sweet potato; see Girard (2001, p. 495). It is interesting to note that fifty or so years after its introduction (see above) it was widely cultivated.

³¹³ 'A plant with edible rhizomes, the size of a pine cone, which, when cooked, forms the basis of the food of the Philippine Indians', according to Girard (2001, p. 495). Probably varieties of taros, *Colocasia esculenta* Schott; see anon. (1974a, pp. 335–430)..

³¹⁴ These are certainly Chinese cowpeas, *Vigna sp.*, cultivated in Guangdong ever since ancient times. See anon. (1974a, p. 293).

³¹⁵ This is certainly the curcuma, *Curcuma longa* L. (= *C. domestica* Valet), today named *jiang huang* 薑黃 in Chinese.

³¹⁶ 'Almirón (an Andalusian word): wild chicory or dandelion' according to Girard (2001, p. 495). Possibly varieties of sow thistle, *Sonchus oleraceus* L., *ku mai cai* 苦蕒菜. Today several varieties are cultivated in Canton. See anon. (1974a, pp. 163–71).

³¹⁷ Possibly bamboo shoots or the heart of sugar cane. On the qualities of the tastes of bamboos, see Young (1954).

³¹⁸ Girard (2001, pp. 219–20). At this point, Cortes for the first time mentions important current Chinese ways of preparing foodstuffs, such as products from lactic fermentations, *pao cai* 泡菜. For contemporary examples, see Métaillé (1999b).

³¹⁹ These must be the berries of *Smilax china* L., the China root (Duchesne 1836, p. 32) or some similar species such as *S. glabra*.

³²⁰ Not identified.

³²¹ These are the Chinese olives, *gan lan*, that have been mentioned above for their kernels. Here it is the pulp of the fruit itself that is pressed.

was not published at the time when it was written because the author did not think it right to speak of the action of Christian missions in China in which he himself took no direct part.

Alvaró de Semedo (1585–1658),³²² a Portuguese Jesuit, lived in China from 1613 until his death, in Macao. In 1641, he published in Madrid, in Portuguese, his *Relação da propagação da fé no reyno da China e outros adjacentes*,³²³ a Spanish translation appeared in 1642, an Italian edition one year later, a French one in 1645³²⁴ and, in 1655, in London, an English edition entitled *The History of That Great Renowned Monarchy of China*. This text mentions plants already cited but the locations of which are more precisely indicated: rhubarb, peaches and grapes in Shaanxi (Shensi); apricots in Henan; large pears in Shandong; kakis, Chinese bayberries in Zhejiang; litchis and longans in Fujian and Guangdong. He also mentions two products from Hainan, eagle wood³²⁵ and what the natives call *hua li mu* and the Portuguese call rosewood.³²⁶ The former is the basic material used for high-quality incense as well as being a source of *materia medica*, and the latter is a precious wood used for carpentry. We are told that Formosa (Taiwan) produces pepper, cinnamon and camphor and also the China root (Fig. 210) and sarsaparilla (Fig. 192). Semedo mentions, for the first time, other interesting plants with a variety of names: ginseng³²⁷ from the province of Liaodong, ‘a marvellous medicine worth twice its weight in silver’; two ornamental plants, the *la mei* 蠟梅³²⁸ (Fig. 193), wintersweet that flowers in midwinter and gives off a sweet fragrance, and the *diao hua* 吊花,³²⁹ the ‘hanging flower’, which, as its name indicates, is hung in houses and can grow without soil. As well as tea, he mentions two other plants of economic interest, the Japanese lacquer tree³³⁰ and a reed,³³¹ the pith of which is used to make wicks for oil-lamps (*deng xin* 燈心). It is worth noting that such wicks were still being produced in the early 1960s.

Two years after the publication of Semedo’s book, in 1643, another Jesuit missionary, born in Austria, Martino Martini (1614–61), arrived in China, where he composed the manuscript of an atlas that showed the various regions of China.

³²² See Bretschneider (1880, pp. 4–7), Bretschneider (1898b, p. 12).

³²³ For a list of the various translations of the work shortly after it appeared, see Golvers (2001, p. 196).

³²⁴ A new French translation from the Spanish text has now been published. See Semedo (1996).

³²⁵ *Aquilaria agallocha* Roxb., *chen xiang* 沉香. But perhaps this is a similar species that also grows in Hainan, *A. sinensis* (Lour.) Gilg., *bai mu xiang* 白木香, a mediocre carpentry wood that is mainly used as a source of incense; see Zhu Zhisong (1964, p. 221).

³²⁶ Bretschneider (1898b, p. 6) noted that this named wood was well known but the tree from which it came remained unknown. Two closely related species produce it. The more highly valued is *Dalbergia odorifera* T. Chen, *jiang xiang huang tan* 降香黃檀; the other is *D. hainanensis* Merr. et Chun, *Hai-nan huang tan* 海南黃檀. See Zhu Zhisong (1964, pp. 532–7 and 537–41). On the subject of Martini’s book, Bretschneider (1880, p. 15) cites not ‘rosewood’, but the original text, which takes over the Portuguese term *pao de rosa*, and then *lignum Rosae*.

³²⁷ *Panax ginseng* C. A. Mey., *ren shen* 人參. ³²⁸ *Chimonanthus praecox* (L.) Link.

³²⁹ Possibly *Dendrobium nobile* Lindl., *diao lan hua* 吊蘭花, an ornamental orchid. Bretschneider (1880, p. 7) remarks that *diao hua* ‘is a general name for several species of Aërides and Vanda, possessing the peculiar property of existing many months suspended in the air’.

³³⁰ *Rhus verniciflua* Stokes (= *R. vernicifera* DC.), *qi shu* 漆樹.

³³¹ *Juncus effusus* L., the common rush *deng xin cao* 燈心草.

(a1)



(a2)

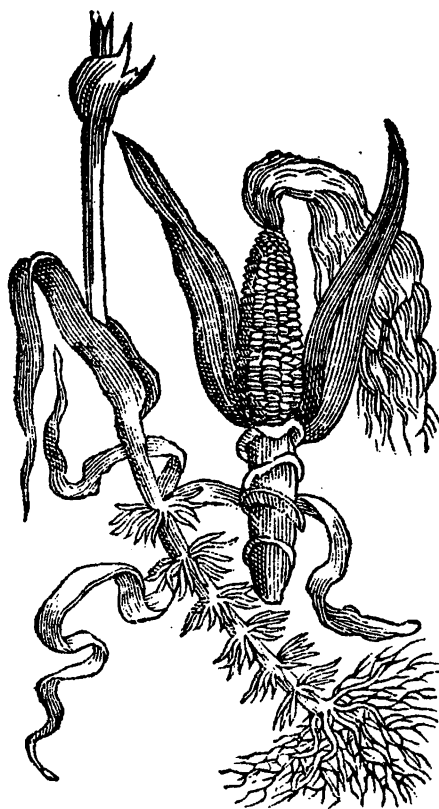


Fig. 191. Representations of maize: (a1, a2) from *Rerum medicarum Novae Hispaniae* . . . by Francisco Hernandez (1651, pp. 242–3); (b) from *Ben cao gang mu* (1640, *Tu, gu bu, ji su tu, juan zhong* 本草綱目圖, 穀部部, 稷粟圖, 卷中, 24a).



Fig. 192. Sarsaparilla, *Smilax aspera* L., in Tabermontanus (1613, p. 611); see also Fig. 186.



Fig. 193. Wintersweet (*la mei* 臘梅, *Chimonanthus praecox* (L.) Link.), from *Ye cai bo lu* (1662, xia, p. 31a).

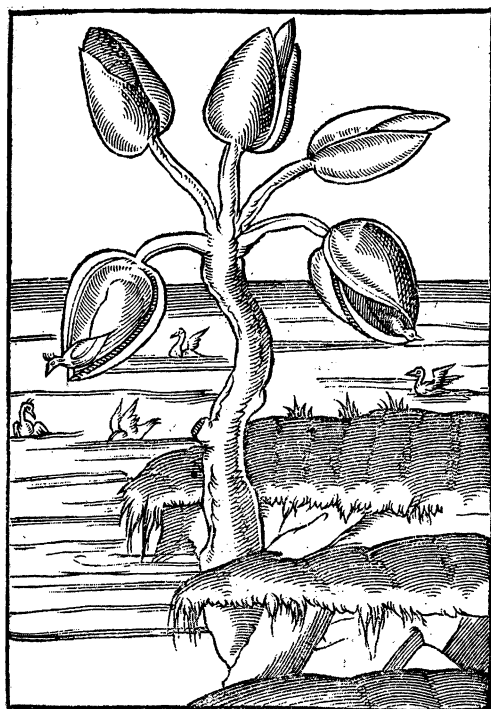


Fig. 194. 'Tree bearing shells that produce birds', after the book by Duret (1605, p. 316).

However, the author based his text not on fieldwork enquiries in all the different regions of China, but on Chinese geographical treatises, in particular the *Da Ming yi tong zhi* 大明一統志 (1461) by Li Xian 李賢 (1408–66) and the *Guang yu tu* 廣輿圖 (1555) by Luo Hongxian 羅洪先 (1504–64).³³² He returned to Europe in 1653 to prepare, in Vienna, for the publication of his book, which was produced in Amsterdam in 1654, with the title *Novus Atlas Sinensis*, 'the major seventeenth-century Jesuit cartographic work on China in Europe'.³³³ He returned to China and died in Hangzhou. Emil Bretschneider extracted from this New Atlas forty-six passages that presented information on the subject of plants.³³⁴ At this point I shall do no more than mention anything that is not contained in books previously cited, and I encourage readers to consult the text of this author if they seek an exhaustive list of the plants that he cites. This work differs in a number of respects from those previously mentioned. It consists, on the one hand, of a kind of inventory of different geographical regions. The book contains maps of various regions of China. The particular regions where the plants are to be found are named. It is interesting to note that the information given coincides with that provided by Semedo and in

³³² Cf Foss (2001, p. 757).

³³³ Foss (2001, p. 757).

³³⁴ Bretschneider (1880, pp. 7–21; 1898b, p. 13).

some cases improves upon it. For instance, sugar cane is reported to grow in Sichuan; in Fujian, high praise is once again given to the extraordinary quality of the kind of orange with rind that is easily separated from the pulp and that Bretschneider identifies as that which Europeans resident in China call the mandarin orange.³³⁵ In Guangdong province, which has all the kinds of citrus fruit already mentioned for Fujian, Martini tells us that there is also a particular kind with fruits that the Chinese call *yeu gu*, the Portuguese call *jamboa* and the Dutch call *pampelmoes*. These fruits grow on thorny trees resembling lemon trees; they have pink flesh and a slight taste of grapes. Here we find once again, with extra terminological precision, moreover, the same remarks as those made by Adriano de la Cortes. This is certainly the *you zi* 柚子,³³⁶ the pummelo or shaddock. A new fruit is mentioned in Huguang 胡廣,³³⁷ 'a citron known as 'idoli manum', 'idol's hand', which is none other than the 'hand of Buddha' (*fo shou* 佛手).³³⁸ Another novelty is to be found in Guangxi, where there is a tree called *guang lang*, with the pulp of its flesh an edible flour is made. This must be the *guang lang* 桃榔, the gomuti palm.³³⁹ Bretschneider transcribes this name as *guang lang* 光榔 and identifies it with a *Caryota*. There is indeed a species of this genus,³⁴⁰ the pith of which serves as a replacement for the former fruit: it is the Chinese fishtail palm (*yu wei kui* 魚尾葵), also known as 'false guang-lang' (*jia guang lang* 假桃榔), which grows in the same regions. Zhejiang possesses an aquatic 'fruit' that the Chinese call *peci* and that, when placed in one's mouth and chewed alongside a coin, is supposed to render the coin edible. This is in fact the water chestnut (*bi qi* 荸薺),³⁴¹ which is certainly very pleasant to eat but whose remarkable property reported by Martini has, to this day, never been confirmed even after the serious test made by Louis Lecomte, which will be described presently. In stagnant water throughout China another aquatic fruit is to be found, the *lin kio*. This transcription has been used for *ling jiao* 菱角,³⁴² which is the name for water caltrop, another water chestnut. Martini also draws attention to four major ornamental plants, the *Rosa sinica*, 'which the Chinese call *meutan*, and the Portuguese name *mogorin*', and also a tree with the leaves of a bay tree or a cinnamon tree, which produces flowers, *quei*. These, respectively, are the cotton rose (*mu fu rong* 木芙蓉),³⁴³ the tree peony (*mu dan* 牡丹), the Arabian jasmine (*mo li hua* 茉莉花)³⁴⁴ and the sweet olive (*gui* 桂).³⁴⁵ He also mentions products of economic interest that are sources of textile fibres, the cotton in the lower valley of the Yangzi river, and in Jiangxi the grass cloth plant,³⁴⁶ 'with which one weaves summer clothing that is a perfect foil to the heat and perspiration'. In Guizhou province, he picks out a plant called *co*, the source of textile fibres that are used to make

³³⁵ King oranges. See above, p. 583 note 296. ³³⁶ *Citrus maxima* (Burman) Merrill (= *C. grandis* (L.) Osbeck).

³³⁷ The combination of the four provinces Hunan, Hubei, Guangdong and Guanxi.

³³⁸ *Citrus medica* L. var. *sarcodactylis* (Noot.) Swingle.

³³⁹ *Arenga pinnata* (Wurmb.) Merr. (= *A. saccharifera* Labill.). ³⁴⁰ *Caryota ochlandra* Hance.

³⁴¹ *Eleocharis dulcis* (Burm. F.) Trin. ex Hensch. (= *Eleocharis tuberosa* Roem. et Schult.)

³⁴² *Trapa bispinosa* Roxb. ³⁴³ *Hibiscus mutabilis* L. ³⁴⁴ *Jasminum sambac* (L.) Aiton.

³⁴⁵ *Osmanthus fragrans* Lour. Nowadays called *mu xi* 木樨 or *gui hua* 桂花.

³⁴⁶ *Boehmeria nivea* Hook. et Arn., *zhu ma* 苧麻.

very practical summer clothing. This is *ge* 葛,³⁴⁷ *Pueraria*, kudzu. In Guangxi, there is a red banana tree, *Musa rubra*,³⁴⁸ from which textile fibres can be obtained. Without providing any details or names, Martini refers to the province of Shandong, where there are trees the leaves of which feed wild silkworms that produce a type of silk. As Bretschneider notes, these are varieties of oak tree.³⁴⁹ He also records that this silk is named Shantung pongee, *jian chou* 繭綢 in Chinese. Martini also notices that willows, *lieu* (*liu*) in China become ‘weeping’ willows because the long branches are bent down in order to root them in the ground. On this subject, Bretschneider writes as follows:

I may observe that *Salix babylonica* L. in Europe and Western Asia is generally seen with its branches bending down, whilst in China (in Northern China at least) where this tree, 柳樹 *liu shu* in Chinese, is very common, its branches shoot originally upwards.³⁵⁰

Martini also notes that in Guangdong province there are many trees with fragrant wood. As well as eagle wood, there is what the Portuguese call *pao de rosa*,³⁵¹ already mentioned by Semedo, while in Hainan, as well as the two trees just mentioned, one also finds the *Ebenum*,³⁵² as well as the tree generally known as *Brasilum*,³⁵³ which ‘is used throughout China by dyers’. He also mentions the ironwood in Guangxi and the bamboos in Zhejiang. In Guangdong, there is what the Chinese call *teng* and the Portuguese call *rota* growing all over the place; these are long lianas with fearsome thorns that are used to fabricate many different objects, including rope for ships known as rattang.³⁵⁴ In Zhejiang province, there are trees that exude a substance that ‘resembles the tears of turpentine trees’ and that are called *cie*.³⁵⁵ In that same province, another tree produces a liquid,

³⁴⁷ *Pueraria lobata* (Willd.) Ohwi (= *P. thunbergiana* (Sieb. et Zucc.) Benth.). The stems of this plant provide textile fibres which, when woven, constitute ‘Canton silk’ and the root – which may become very voluminous – is turned into edible flour in Japan, known as *kuzu*.

³⁴⁸ *Musa uranoscobus* Lour. (= *M. coccinea* Andrews), *hong jiao* 紅蕉 or *zhi tian jiao* 指天蕉. Bretschneider (1880, p. 14) relied on the mention of a ‘tissue from a red banana tree’ (*hong jiao bu* 紅蕉布) in the *Da Qing yi tong zhi* 大清一統志, ‘The Great Geography of the Qing Empire’, compiled on imperial orders and begun in 1686. A first edition in 342 *juan* was completed in 1743, a second in 500 *juan* in 1784. A third and last edition that takes into account information up until 1820 appeared in 1842. See anon. (1979, *Ci hai*, p. 1456); see also Bretschneider (1881, p. 87) for a brief description of this work.

³⁴⁹ Bretschneider (1880), p. 14.

³⁵⁰ Bretschneider (1880, p. 15).

³⁵¹ See note 327. Going by the name *pau-de-rosas*, ‘wood/tree of roses’, there today exists in Brazil a species that provides a highly valued cabinetmaking wood, *Physocalimma scaberrimum* Pohl (Lorenzi 2002, Volume 2, p. 238) which, however, is not the species referred to here.

³⁵² Bretschneider identifies this ebony as Loureiro’s *Ebenoxylum verum*. Among the vernacular names mentioned by Loureiro (1790, p. 613), *O mouc* can be rendered in Chinese as *wu-mu* 烏木, literally ‘black wood’. So a possible botanical identification is *Diospyros eriantha* Champ. (Zhu Zhisong 1964, pp. 819–23), a species representative of which can be found in Hainan, Guangdong, Fujian, Guangxi and Taiwan.

³⁵³ Bretschneider identifies this as *Caesalpinia sappan* L., in Chinese *su mu* 蘇木, the wood of which, still today, provides a precious red dyeing substance, while the roots supply a yellow substance. See anon. (1972–6, Volume 2, p. 350).

³⁵⁴ Twenty or so species of the genus *Calamus* are to be found in China, mostly in the southern and south-western regions. Among them, two of the most common are *sheng teng* 省藤 and *bai teng* 白藤. The interior of the stems, after being sliced, is used for many kinds of basket-work; see How Foon-Chew (1982, p. 76).

³⁵⁵ These are *qi* 漆, lacquer, produced by the lacquer tree, *qi shu* 漆樹, *Rhus verniciflua* Stokes (= *R. vernicifera* DC.).

kieu yeu.³⁵⁶ This white and odourless wax, from which candles are made and which does not stain one's hands or leave an unpleasant odour when the candles are extinguished, comes from the berries of the tree; the berries exude this substance when they are soaked in hot water. In the four provinces of Huguang an *alba sera* is harvested, a white wax produced by tiny worms or animalcules.³⁵⁷ Martini also reports on the breeding of silkworms and the plantations of mulberry trees in the provinces of Fujian and Zhejiang. In the wake of Semedo, he too praises the 'much-celebrated *Ginseng*', *nisi*, of the Japanese, which is to be found in the north-east. He also notes the cultivation of rhubarb in Shaanxi (Shensi). Then he describes the China root, *radix sina*, distinguishing two kinds of it, the 'true', 'which the Chinese call *folin*', and the 'woodland' type, which is less efficacious than the former. On this subject, Bretschneider comments that here too Martini is the first to distinguish between these two products of *materia medica*: the first is *fu ling* 茯苓, a mushroom, the second is *tu fu ling* 土茯苓,³⁵⁸ Chinese sarsaparilla. We also learn from the atlas that, in Zhejiang, in the mountains close to Hangzhou many mushrooms grow; after being dried, these are sold throughout China. These may be shiitakes (*xiang gu* 香菇).³⁵⁹ Drinking the water used to soak a plant that grows in Huguang, *herba mille annorum*, makes hair that has turned white revert to black. This plant is *qian sui lei cao* 千歲蘿草,³⁶⁰ a woody liana between five and nine metres long found in the thickets and forests scattered across the mountains (ranging from 500 to 2,300 metres) of central and southern China. In the island of Hainan, we are told, there is a tree that, 'in India, is usually called *jaca*',³⁶¹ the bread tree, the fruits of which are so large that they cannot be borne by branches and so emerge from the trunk. This fruit, with a hard rind, contains yellow pulp, very smooth once it is ripe, with stones that taste of chestnuts. There is also a grass that 'knows the winds' (*zhi feng* 知風). Bretschneider, copying the Chinese transcription and the Latin text meaning 'showing the wind', writes 指風; being unable to identify this, he refers it to *juan* 92 of the *Guang qun fang pu*, where the name is correctly written. The text explains the etymology of the name; depending on whether or not there were nodes present on the stems of the plant, a graminaceous one,³⁶² it was thought that there either would or would not be storms; the number of nodes indicated how many there would be and the

³⁵⁶ *Jiu you* 柏油 is the name of the oil from the *wu jiu* 烏柏, the Chinese tallow tree, *Sapium sebiferum* (L.) Roxb. (= *Stillingia sebifera* Mich.), an oil used for industrial purposes.

³⁵⁷ Bretschneider (1880, p. 18) remarks, 'This seems to be the earliest notice given by a European observer with respect to Chinese Insect Wax produced, as is well known, by the *Cocus pela* Westw. living upon the branches of *Fraxinus chinensis* Roxb. and other species, and also on *Ligustrum lucidum* Ait.

³⁵⁸ Nevertheless, although Martini certainly distinguishes two different products, it is the mushroom *fu ling* (*Poria cocos* (Schw.) Wolf.) that he considers to be the 'true' China root, which is, in fact, not the case. See note 219 above.

³⁵⁹ *Lentinus edodes* (Berk.) Sing. ³⁶⁰ *Vitis flexuosa* Thunb. *ge lei* 葛蘿.

³⁶¹ *Artocarpus incisa* (Thunberg) L. f. (= *Artocarpus communis* Forst.), today with a similar name in French, *arbre à pain*, *mian bao shu* 面包樹, the fruit being, as in English, *mian bao guo* 面包果, breadfruit; *bo luo mi* designates a similar species, *Artocarpus heterophyllus* Lam.

³⁶² *Eragrostis ferruginea* (Thunb.) Beauv.

distance of the nodes from ground level indicated the months in which these violent winds would occur. In Yunnan, writing about the town of 'Vuting' (Wuding 武定), Martini records that 'according to the Chinese author',³⁶³ there are, close to the lake *hoei niao* (*hui niao* 回鳥, literally 'returns-birds') trees of the same name, some of whose leaves, when they fall into the water, are transformed into black birds.³⁶⁴ Two of the plants cited have been impossible to identify, *hua gu* 花骨, 'bone flower', and *meng hua* 夢花, 'dream flower'. As can be seen, the atlas is by no means purely geographical. In fact, the fifty or so botanical species of economic interest that it describes or mentions were later of interest to authors who, writing about China after Martini, often mentioned them or even claimed to have discovered them themselves.

The title of the next treatise, *Flora Sinensis* by Michael Boym (1612–59), might suggest that this is an early monograph on the plants of China. In fact, though, this text, published in Vienna in 1656, describes plants that are of interest on account of their fruit but that are essentially from tropical regions. The author, a Polish Jesuit, left for the Far East from Lisbon in 1642. He arrived in Macao in 1645. There, the provincial of Japan, João Cabral, sent him with three other missionaries to work in Hainan, where they arrived in January 1647. After Hainan was occupied by the Manchus on 1 November of that same year, they moved to Tonkin, where they stayed until February 1649, at which point they returned to Macao.³⁶⁵ In 1650, Boym set off on a mission to Rome to ask the Pope for the papacy's spiritual support for the Ming pretender to the throne, Yong Li. He remained in Europe until March 1656, when he once again set off from Lisbon for Goa. He died on 22 August 1659, upon arrival in Guangxi.³⁶⁶ These brief biographical notes show that before the publication of his book, all he knew of China were the island of Hainan and the Macao region. However, like Johann Schreck, during his travels he may well have landed to make observations in the various countries where his ship stopped. It is therefore not surprising that 'he presents his reader with the most curious fruits of the East Indies & China', as he remarks in his 'Afterword to the Reader'.³⁶⁷ The book, which in its last part also refers to a few animals, is mainly concerned with plants. Twenty-four are named, twenty of which are also the subjects of fairly faithful illustrations, alongside which the plant's Chinese name is inscribed in Chinese characters and is also transcribed according to the Portuguese custom. After several introductory texts – a dedication, a poem glorifying the author, and so

³⁶³ His source is probably the geography treatise *Da Ming yi tong zhi* 大明一統志 by Li Xian 李賢 (1408–66), referred to in the information relating to the grass that 'knows the winds', which has been cited above.

³⁶⁴ This cannot fail to call to mind the trees whose leaves and fruits are transformed into animals, which are frequently mentioned in works of the European Renaissance and are described in particular by Claude Duret in Chapter 17 of his *Histoire admirable des Plantes* (1605, pp. 304 ff.) (Fig. 194). On animal transformations, see also Métaillé 2004 (a).

³⁶⁵ See Malatesta (1995, pp. 355–6).

³⁶⁶ For detailed information about the life and work of Michael Boym, see Pelliot (1935), Szcześniak (1955), Kajdański (1986; 1987) and Malatesta (1995) for the details that he provided on information in earlier publications.

³⁶⁷ In the translation by Thévenot (1696).

on – and just before the prologue, three pages are devoted to *yay cu* (*ye zi* 椰子), ‘*Palma Persica* & *Indica* or *Sinica*, more commonly known as *Coco* and *Nux Indorum*’, the coconut, and under the title *pim lam* (*bin lang* 檳榔), one page is devoted to the ‘Areca fruit and the Bethel leaf’. These two texts contain general remarks about those three plants along with references to China. They are accompanied by no illustration or Chinese characters. In the case of the coconut, Boym justifies the absence of an image, saying ‘a picture can be found in any herbal’. The remark testifies to his familiarity with works of this kind devoted to *materia medica* and natural history. The actual flora, the pages of which are labelled A to V, starts with *fan yay cu* (*fan ye zi*), the papaya,³⁶⁸ the name of which, as the text states, is *papaya* in India and which, in China, is produced only on the island of Hainan but not at all on the mainland. The Chinese name given is *fan ye shu* 反椰樹 for the tree and *fan ye guo zi* 反椰菓子 for the fruit. The full-page illustration (Fig. 195) is perfectly recognisable. From then onward, for each plant cited, there is an illustration showing the tree and a detailed representation of the fruit, and each image is accompanied, as is mentioned above, by the name of the tree and the fruit. The next plant named is *pa-cyao* (*ba jiao* 芭蕉), a banana tree³⁶⁹ that Boym calls ‘*Ficus Indica* & *Sinica*’, following the nomenclature of the ‘natural histories’ of the European Renaissance. He explains that the fruit can be found throughout the year in the Indies and the southern regions of China, but in northern regions, although it produces an abundance of leaves, there are no fruits. He also notes that in Brazil the name is *banana* and in Damascus *musa*. For the next fruit, named *kiā-giú* or *kagiu* (*jia ru* 欖如) (Fig. 196), the cashew nut,³⁷⁰ the text states that it is an ‘Indian’ fruit that is not to be found in China, although it would be possible to cultivate it in Yunnan, Guangxi and also in the Chinese islands. *Lí-cī* (*li zhi* 荔枝) and *lum-yen* (*long yan* 龍眼) are then described as fruits exclusive to the southern provinces of China: they are fruits that are dried and exported to other regions. The author remarks that the fruits of trees growing wild have large stones and quite bitter flesh, but when ‘transplanted’ most have small stones and sweet flesh.³⁷¹ Only the litchi is illustrated (Fig. 197). We are told that the following fruit, named *giam-bo* in the text and transcribed as *giām-pō* (*rang bo* 攘波) on the illustration, exists in two species, the one red and the other white. In China, it is cultivated in Macao and to the north of that town, on the island of Xiangshan. This is the rose-apple (Fig. 198).³⁷² We are told that the next fruit, the pineapple, is called *fan-pō-lō-miē* (*fan bo luo mi* 反波羅密) (Fig. 199) by the Chinese and *ananas* by the Indians. Boym adds that it grows in abundance in Guangdong, Guangxi, Yunnan, Fujian and the island of Hainan, and that its cultivation was introduced into the East Indies from Brazil. When he first travelled to Macao, Boym had seen this plant in Mozambique, where he had made a

³⁶⁸ *Carica papaya* L. ³⁶⁹ *Musa* sp. ³⁷⁰ *Anacardium occidentale* L.

³⁷¹ It is worth noting that the reduction in the size of the stones which, in the Chinese texts mentioned earlier, was considered to be the result of grafting, is here attributed to domestication.

³⁷² *Syzygium jambos* (L.) Alston (= *Eugenia jambos* L.), today called *pu tao* 葡桃.

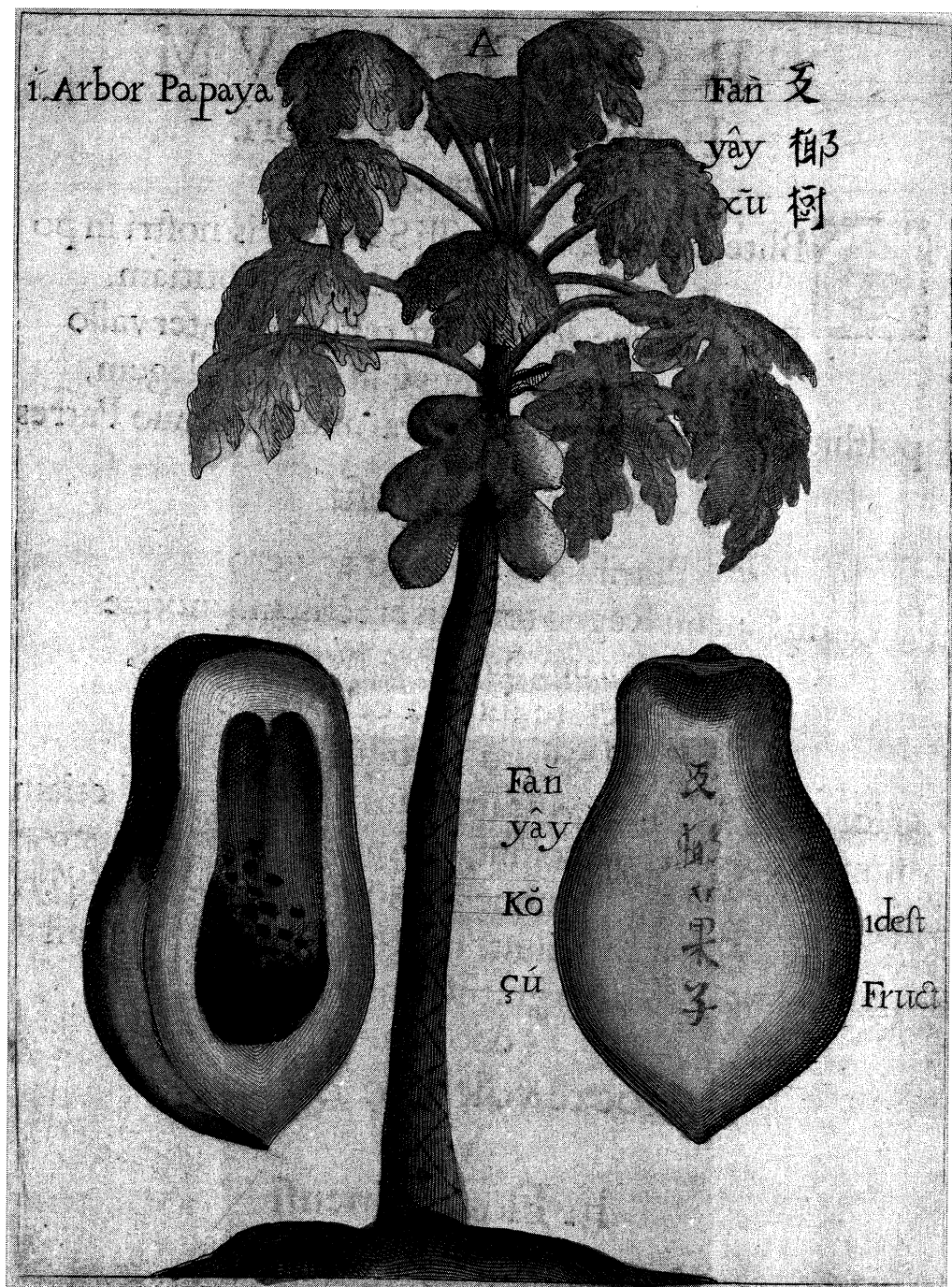


Fig. 195. *Fan yay cu* (*fan ye shu* 反椰樹), papaya, from Boym (1656, A1 verso).



Fig. 196. *Kiā-giū, kagiū (jia ru 檳如)*, cashew nut, from Boym (1656, B1 verso).



Fig. 197. *Li-ā (li zhi 荔枝)*, litchi, from Boym (1656, B2 verso). Compare with Fig. 32.



Fig. 198. *Giâm-pỗ (rang bo 攘波)*, rose apple, from Boym (1656, C1 verso).

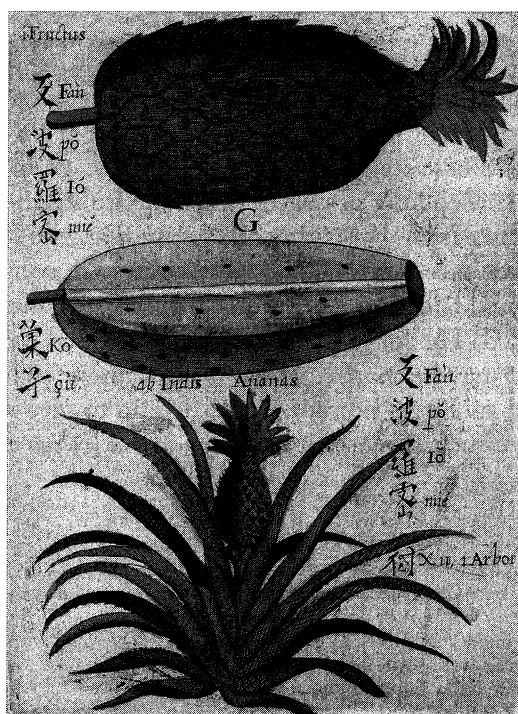


Fig. 199. *Fàn-pỗ-lỗ-mi (fan bo luo mi 反波羅密)*, pineapple, from Boym (1656, C2 verso).

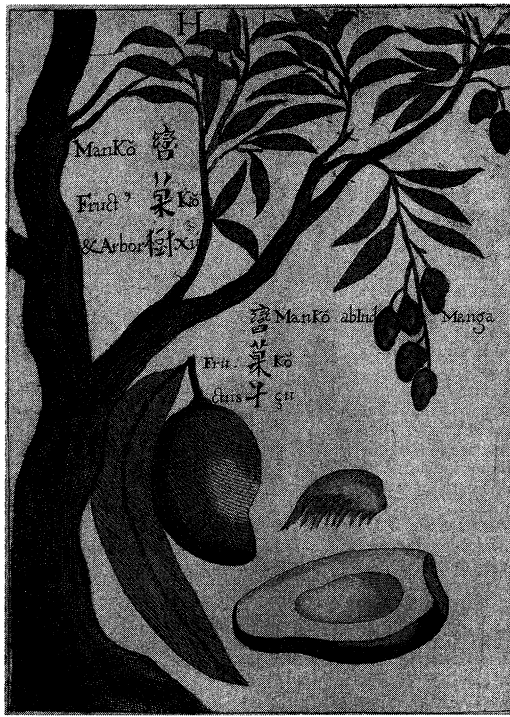


Fig. 200. *Man-kō* (*mang guo* 芒果), mango, from Boym (1656, D1 verso).

coloured drawing of it accompanied by the following text in Latin, ‘Ananas African fruit with an excellent smell and taste, with no stone’.³⁷³ The mango tree, called *mankō* 𣎵³⁷⁴ by the Chinese and *manga* by the Indians, grows in southern lands. Boym notes that it is turned into ‘preserves’ when the fruit is still green,³⁷⁵ but when it is ripe its taste is better than that of any other fruit (Fig. 200). The next fruit to be mentioned is one of the rare products, along with the kaki, considered, in this flora, to be native to mainland China. It is the *p’i-p’â* (*pi pâ* 枇杷), the loquat, ‘with a very sweet taste’ (Fig. 201).³⁷⁶ The following fruit is the *cieu ge* (*chou guo* 臭菓),³⁷⁷ which the Indians and the Portuguese name *goyava*. The Chinese name, ‘stinking fruit’, conveys the fact that, as Boym notes, the fruit is said to give off a strong bug-like smell (Fig. 202). Boym then lists a fruit called *pō-lō-mié* (*bo luo mi* 波羅密) (Fig. 203)

³⁷³ *Ananas fructus aphricus optima saporis et odoris sine nucleo*; see Malatesta (1995, p. 355, n. 7).

³⁷⁴ This is the only case in the book where a single character is transcribed as a disyllabic word. This character no longer has any attested botanical meaning. The contemporary name is *mang guo* 芒果 (=芒果), *Mangifera indica* L.

³⁷⁵ The author probably understands these to be types of chutney.

³⁷⁶ The first character in the word seems to be incorrect.

³⁷⁷ *Psidium guajava* L., guava, today known as *fan shi liu* 番石榴.



Fig. 201. *P'î-p'á* (*pí pá* 枇杷), loquat, from Boym (1656, D2 verso).



Fig. 202. *Cieu-kó* (*chou guo* 臭菓), guava, from Boym (1656, E1 verso).



Fig. 203. *Pō-lō-mié* (*bo luo mi* 波羅密), jackfruit, from Boym (1656, E2 verso).

by the Chinese and *giaca* by the Portuguese. This is the jackfruit.³⁷⁸ He says that inside the cavity formed by the spicy rind of the fruit there are groups of more fruits, the pips of which have a chestnut-like taste.³⁷⁹ He goes on to say that, in this way, a single fruit actually contains several more, enough to feed ten or twenty people. He ends by stating that fruits appear in May or June, without there having been any blossoming.³⁸⁰ He then passes on to a 'Chinese fruit' (*fructus sinicus*), the *su-pim* (*shibing* 柿餅), literally the 'kaki cake'. This name certainly applies to dried kaki fruits, which Boym likens to the figs prepared in Europe, and which constitute an important product for *materia medica* (Fig. 204).³⁸¹ The next fruit, a product of the Indies and Malacca, is known in China only because it is offered there as tribute.

³⁷⁸ *Artocarpus heterophylla* Lam. (= *Artocarpus intergrifolia* L.); see Tanaka (1976, p. 66).

³⁷⁹ Bois (1928, p. 488) declares, 'this is one of the largest known fruits in the entire world . . . After fecundation, the whole of the female inflorescence develops in a fleshy mass by gathering together all its welded parts and thus forming a composite fruit (or *syncarpe*). When ripe, this fruit is brownish-green, bearing a multitude of spikes formed by the persistent stalks of all the carpels. It contains numerous seeds (which are, strictly speaking, the actual fruits), about the size of a chestnut and which are given that name and are used in the same way as we use our European chestnut trees, roasting the fruit or boiling them in water'.

³⁸⁰ Because the inflorescence already has the shape of a fruit in a smaller format and the flowers are inserted within the cavities of this thick receptacle, it is hard to see them.

³⁸¹ On the medicinal aspect of the plants cited in the Chinese texts, see Flaumenhaft (1982).



Fig. 204. *Sû-pim* (*shì bǐng* 柿餅), persimmon, from Boym (1656, F1 verso).

It is the *ya da* 亞大, which has an exquisite taste, the sweetsop.³⁸² Bretschneider notes that *ya da* is a transcription of the Singalese name of the *atta* fruit (Fig. 205).³⁸³ The next fruit cited comes from Java, Malacca, the Celebes, the Kingdom of Siam and also certain islands that pay tribute to China. It is the *du-liam*, *dú-ri-âm* (*tu lì rang* 土利攘), the civet durian.³⁸⁴ Boym notes the resemblance of this fruit to the jackfruit, both outside and inside. He explains that it disagrees violently with the betel leaf, mere contact with which leads to immediate infection. In a case of heat brought on by eating too much of the fruit, swallowing a single betel leaf is enough to 'extinguish the inflammation'.³⁸⁵ The next fruit on Boym's list is one that he encountered for the first time in Hainan, and he confesses that he cannot remember its Chinese name, so his heading for the paragraph devoted to it is '*Innominatus Fructus*', 'nameless fruit'. The illustration that he provides and his description of it suggest 'a large tree with immense leaves that can cover half the body of a man',

³⁸² *Annona squamosa* L., today *fan lì zhī* 番荔枝.

³⁸³ Bretschneider (1880), p. 23.

³⁸⁴ *Durio zibethinus* Murr., today *liú lián* 榴蓮.

³⁸⁵ Today too, the durian is considered by the Chinese of South East Asia as a very 'hot' food. When eaten, it should be consumed on its own, accompanied by drinks of water, or else by mangosteens, fruits that are reputed to be 'cold'. See Métaillé (1979 (b), p. 120).

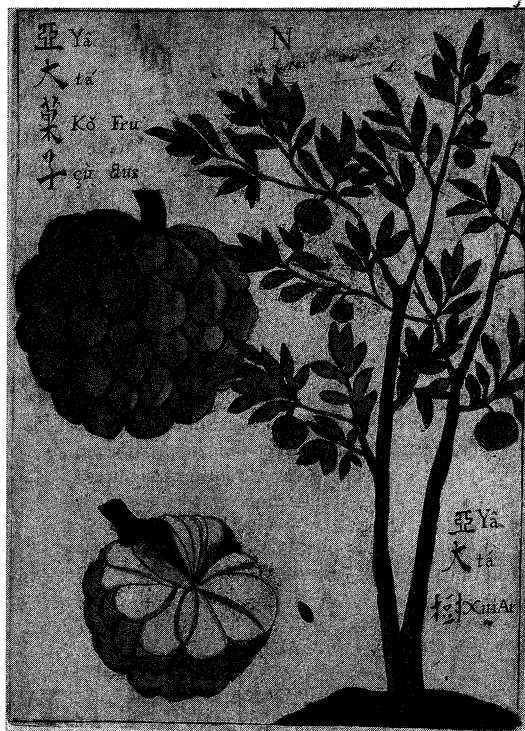


Fig. 205. *Yā-tá* (*ya da* 亞大), sweet soap, from Boym (1656, F2 verso).

with partially visible roots that bear flowers and fruits similar to European figs, which turn red when ripe. Bretschneider – followed by Walravens³⁸⁶ – believes this to be *Cynometra cauliflora* L.,³⁸⁷ a Leguminosa (Fabaceae). However, even if the trees of this species do have fruits that grow out of the base of the trunk, those fruits do not resemble figs and the leaves correspond neither in shape nor, certainly, in size to those depicted in the image to be found on page H1 of the *Flora Sinensis* (Fig. 206). I believe that this unknown fruit may be identified with that produced by a tree that is native to India, Pakistan, Vietnam and southern China and that is described by Loureiro,³⁸⁸ the *Ficus auriculata*, a fig tree, of the Moraceae family, the elephant-ear fig tree (*xiang mu rong* 象耳榕, *mu gua rong* 木瓜榕, *da guo rong* 大果榕 or *man tou guo* 饅頭果). The plants that appear in the following pages of the book are presented under the title *Aromaticae Arbores*, ‘aromatic trees’. The first is *piper*, *hú-cyao* (*hu jiao* 胡椒).³⁸⁹ This is the pepper tree,³⁹⁰ the image of which resembles one that is to be

³⁸⁶ Walravens (2011, p. 344). ³⁸⁷ Bretschneider (1880), p. 24. ³⁸⁸ Loureiro (1790), p. 666.
³⁸⁹ The first character in the name that appears with the ‘Q’ image on p. H2 in the book is certainly *hu* 狐, ‘fox’. This is an error; it should be 胡, which, as we have already seen, appears as the determining character in many names that designate products of foreign origin, since the primary sense of the term is ‘non-Chinese population’.
³⁹⁰ *Piper nigrum* L., *hu jiao* 胡椒.



Fig. 206. *Innominatus Fructus*, 'fruit without name', from Boym (1656, G2 verso). Possibly *Ficus auriculata* Lour., see anon. (1972–6, Volume 1, p. 496).

found in Jacques Dalechamp's work (Fig. 207a, b). The next entry is *rhabarbarum*, in Chinese *tayhuam* (*tai huang* 太黃). Two representations of it are given (Fig. 208a), one of them being 'matur' (*kàn* 甘); here *matur* no doubt stands for *maturus*, meaning 'ripe'. As for the Chinese character standing for *kàn*, no direct reference is made in the text to this term, which means 'sweet, sugary', but, on the other hand, since we are told that as the plant ripens the leaves turn yellow and dry, I imagine that there is an error here and that *gan* 乾 should be read as 'dry'. The fact is that while the figure at the bottom of the page represents a fresh plant with small secondary roots, the image higher up shows the plant once the main root and those surrounding it have been cut, for the roots constitute the principal *materia medica* that is extracted from rhubarb. A similar illustration of two plants, in this case representing two distinct species, is to be found in the book by Tabermontanus (Fig. 185). Next comes an illustration of cinnamon *kuey pi* (*gui pi* 桂皮). The image is not shown opposite the text as it is for other plants but is next to that of durian, and the transcription of the name in this context is slightly different: *quey pi* (Fig. 209). The text announces that it comes from Guangdong province and Guangxi province and also from Tonkin, but the best kind is that of Ceylon; Chinese merchants go there to find it and then sell it in the straits of Ormuz. On the subject of the *radix sinica* or *china*, Boym explains that

(a)



(b)

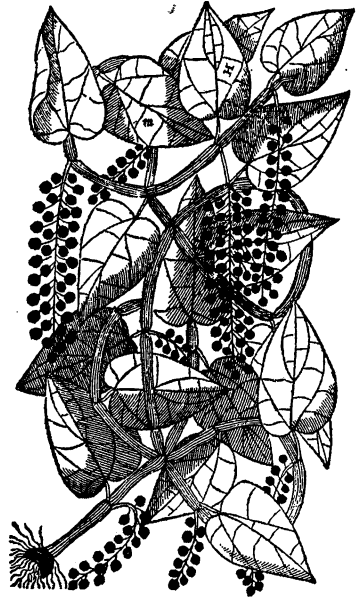


Fig. 207 (a) Top, *hú-cyao* (*hu jiao* 胡椒), pepper, from Boym (1656, H1 verso); (b) possible model for the previous image in *Historia Plantarum*, by Jacques Dalechamp, reproduced in Arber (1938, p. 106). There may also be a common source for both.



Fig. 208. *Ta-huam* (*tai huang* 太黃), rhubarb, from Boym (1656, H2 verso). Compare with Fig. 185, from Tabermontanus (1613, p. 622).



Fig. 209. *Kuey pi* (*gui pi* 桂皮), cinnamon, from Boym (1656, G1 verso).

the Portuguese call it *pao de Cina*, ‘wood of China’, and the Chinese name for it is *pe-fu-lin* (*bai fu ling* 白茯苓), ‘white *fu lin*’, but on the image that is shown next to that of pepper, the Chinese name is given as just *fō-lin* (*fu ling*). However, although in Portuguese ‘wood of China’, today spelt *pau-da-china*, designates a plant of the *Smilax* genus, the two Chinese names cited by Boym in fact correspond to *Poria cocos* (Schw.) Wolf, a mushroom that has been mentioned above, where the word ‘white’ refers to a particular preparation of it.³⁹¹ However, the graphic representation is certainly that of a *Smilax* (Fig. 210). The last of the plants in the *Flora Sinensis* is ginger, *zingiber*, known as *kiam* (*jiang* 姜). The image shows the whole plant and is accompanied by a note reading *sēmkiām* (*sheng jiang* 生姜), ‘fresh ginger’.

For each of the plants mentioned in the book, Boym, as well as naming it, often gives details relating to its morphology and always provides therapeutic information and the dates when they should be gathered. So this is a flora that is geared to the medicinal uses of plants. The few illustrations that appear in the report that Michael Boym produced at the time of his first brief stop in Mozambique,³⁹² in the course of his first voyage to China, reveal his skill at drawing and his keen sense of

³⁹¹ See anon. (1977b, Fig. 3314).

³⁹² The manuscript, entitled *Cafraria, a P. M. Boym Polono Missa Mozambico 1644 Januario 11*, is preserved in the Archivum Romanum Societatis Iesu in Rome, reference Goa e34-1, ff. 150-60.



Fig. 210. Bottom, *radix sinica* or *china*, *Smilax* sp., from Boym (1656, H1 verso). Compare with Fig. 184c.

observation, which is further confirmed by the text. This suggests that the iconography of the *Flora Sinensis* is for the most part original and reflects what he actually observed for himself. However, it does seem to me that some of the drawings, such as that of rhubarb and that of pepper, may have been influenced by engravings in the books that he consulted at the time of his long stay in Europe between 1650 and 1656. Although the drawings of the kaki and the pipa fruits present a faithful image, the same cannot be said of the aspect of trees that he may not have actually seen in Hainan or in Macao. On the other hand, the case of the ‘nameless fruit’ testifies to that keen sense of observation of his, for this spectacular tree is not at all well known and appears in few contemporary Chinese floras. It is because of its images that this book is so precious, as the case of the *radix sinica* or *china* also testifies. Because of confusion regarding its Chinese name, Boym made a mistaken botanical identification, but nevertheless produced quite a good representation of the plant. It would be interesting to know more about the genesis of this work. Despite its appearance of overall unity, serious differences in the details of the contents of each of the rubrics are noticeable. It would seem that the author had seen for himself what he describes but that he also had access to certain Chinese written sources or else was assisted by Chinese literati. That is what is problematic about the appearance of the hippopotamus among the few animals cited. No doubt, on the basis of the Chinese

name, *hai ma* 海馬, 'sea horse', the term that designates the hippocampus, which someone had cited to him, Michael Boym reused the image that he had noted down in Mozambique, without attempting to verify whether the animal really existed in China. The text certainly does not correspond to what is written in the Chinese pharmacopoeia on the subject of the hippocampus. So Boym must have drawn upon not only the European literature to be found in books of natural history and that of the Chinese *ben cao*, but also on his African experiences. All this combines to make the *Flora Sinensis* not the first botanical work relating to China, but a book the subject of which is the use in China, mainly for medical purposes, of mostly 'exotic' fruits but also a few more or less fabulous animals. One is faced with a multiform text in which the precise results of experience (here the most exemplary case is that of the 'nameless fruit') are set alongside a compilation that is gratuitous³⁹³ but that, for the most part, does relate coherently to the subject. In any case, as with the text by Martini, it was later to be used extensively by compilers in a hurry, some of whom were not particularly scrupulous and would even go so far as to reproduce the image of the hippopotamus. A list of 289 products of Chinese *materia medica*, mostly of plant origin, compiled by Michael Boym, was later, in 1682, published by the German doctor Andreas Cleyer (1634–97/8), who was employed by the Dutch East India Company. It contains a section entitled *Medicamenta simplicia quae a Chinesibus ad usum adhibentur* from Cleyer's *Specimen Medicinae Sinicae*.³⁹⁴ This list of Chinese names transcribed in Portuguese with no Chinese characters 'is altogether devoid of interest and may be quoted only as a bibliographical curiosity'.³⁹⁵ In conclusion, let me repeat Pelliot's appreciation of Boym, which is cited by Edward Kajdanski:

All the same, we should not forget that he always believed that he was serving, not only the cause of the Ming, but also that of religion; and, in singularly difficult conditions, he left us a scientific work which, for his time, was certainly not negligible.³⁹⁶

So far, we have considered two categories of works relating to Chinese plants: on the one hand, those that record things seen in the course of voyages or more or less lengthy stays in China, and, on the other, adaptations of Chinese texts which, of course, repeat Chinese knowledge. The authors were European Jesuit missionaries whose main purpose was not botanical exploration and who, with the exceptions of Johann Schreck and Michael Boym, manifested no particular interest in the study of plants. Before turning to the writings of persons directly concerned with knowledge of the Chinese flora, it is necessary to cite the writings of compilers, many of whom made immoderate use of those published by, in particular, Fathers Martini and

³⁹³ The article on the coconut tree starts with a digression on the date palm, although the text states clearly that 'there are no palms of this kind in China' but immediately adds 'where I, however, think that it would do very well!' A similar remark is made about the *cajou*.

³⁹⁴ See Kajdanski (1986, 1987).

³⁹⁵ Bretschneider (1880, p. 24). On the attribution of the *Specimen* to Boym, see Holler (2001, p. 795, n. 32).

³⁹⁶ Pelliot (1935, p. 151) in Kajdanski (1986, p. 358). My thanks go to Diana Brodie, whose English translation enabled me to read the article that Edward Kajdanski had kindly sent me.

Boym. In the first rank of these authors of compilations is a figure who was included in the entourage of the first embassy of two Dutch envoys to Peking, Jan Nieuhof who, following this visit to China, wrote *Legatio Batavica ad Magnum Tartariae Chamum Sungteium, modernum Sinae Imperatorem*, which was published in 1665 in Amsterdam. The many translations made of this work made him famous throughout Europe. Bretschneider's verdict on him is totally damning. He quite rightly writes as follows: 'This book may well stand as a model of the most impudent plagiarism and imposture in the literature of travels in the 17th century'. The author cites Martini and Boym extensively; the trouble is, though, that he forgets to mention their names. Bretschneider's verdict on a *Description of the Chinese Empire* (1670), an appendix to the account of the two Dutch embassies, written by Olfert Dapper, is hardly more favourable:³⁹⁷

This is also nothing more than a translation of the *Atlas sinensis*, often misunderstood, undigested and undigestible. Nearly twenty pages in it are devoted to the botany of China. The greater part of the drawings of Boym's *Flora Sinensis* are here reproduced and, of course, no sources are added.

A little earlier, in 1667, a work by a Jesuit, Athanasius Kircher (1601–80), had been published in Amsterdam. This was *China Monumentis qua Sacris qua Profanis, nec non variis Naturae et Artis Spectaculis, Aliarum rerum memorabilium Argumentis Illustrata* . . ., the title of which was generally shortened to *China Illustrata*. Chapter vi (pp. 176–90) 'De Exoticis Chinae Plantis', essentially repeated the information provided by Martini and the illustrations by Boym, which were retouched to make them more 'exotic', to the detriment of their precision, as can be seen in the case of the papaya (Fig. 211). However, unlike the two earlier authors, Father Kircher did cite his sources. The same goes for Melchisédech Thévenot (c.1620–92) who, in 1666,³⁹⁸ in the second volume of his *Relations de divers voyages curieux* . . ., published a French translation of the complete *Flora Sinensis*, with its illustrations simply rearranged in a more economical manner (Fig. 212).

With the *Nouveaux mémoires sur l'état présent de la Chine* (1696), we return to an account of things actually seen. The author, Louis Lecomte (1655–1729), and five other Jesuits were 'sent under the aegis of the Academy of Sciences, as the official mathematicians of the King [of France] to Emperor Kangxi, of China'.³⁹⁹ Louis Lecomte arrived in China in 1587 and remained there for almost five years, until 1592. This book, which he published after returning to France, enjoyed considerable success; it was republished five times in French between 1696 and 1701 and was translated into English, Italian and German.⁴⁰⁰ It took the form of fourteen letters addressed to important personages, with each letter concentrating on one particular theme. However, the work's liberty of tone, and the support that he gave to the

³⁹⁷ Bretschneider (1880, p. 25).

³⁹⁸ There were numerous re-editions of this work; in the 1696 edition, which I consulted, the French edition of the *Flora Sinensis* is to be found in the first volume.

³⁹⁹ Touboul-Bouyeure (1990, p. 8). ⁴⁰⁰ Touboul-Bouyeure (1990, p. 9). See also Durand (1992b).



Fig. 211. Papaya. Here Kircher (1670) takes for *China Illustrata* (p. 187) the illustration used by Boym in *Flora Sinensis*, but he adds more details, probably to accentuate the 'exotic' environment surrounding this tree. Compare with Fig. 195.

theses of the Jesuits in the 'Quarrel of the rites' of China,⁴⁰¹ eventually, in 1700, caused it to be condemned by the Sorbonne.

The essential passages relating to plants, which constitute no more than a small part of the work, are to be found in the fourth letter, which is entitled 'On the Climate, Lands, Canals, Rivers and Fruits of China'. He notes a difference between northern regions, where wheat, barley, millets, tobacco,⁴⁰² and black and yellow peas 'to grease one's hair' are cultivated,⁴⁰³ and the crops of the lower Yangzi where rice dominates.⁴⁰⁴ As for fruits, he cites pears, apples, peaches, apricots, figs, grapes

⁴⁰¹ On this point see Gernet (1990, pp. 396, 452). See also numerous references in Standaert (2001).

⁴⁰² Laufer (1924, p. 58) believes that it was the inhabitants of Fujian who, in the Philippines, in Luzon, obtained tobacco seeds, and that they did so during the Wan Li period (1573–1620).

⁴⁰³ For Bretschneider (1880, p. 27), these black and yellow peas are two varieties of soya, *Glycine max* (L.) Merr.

⁴⁰⁴ Lecomte (1990, pp. 140–7).

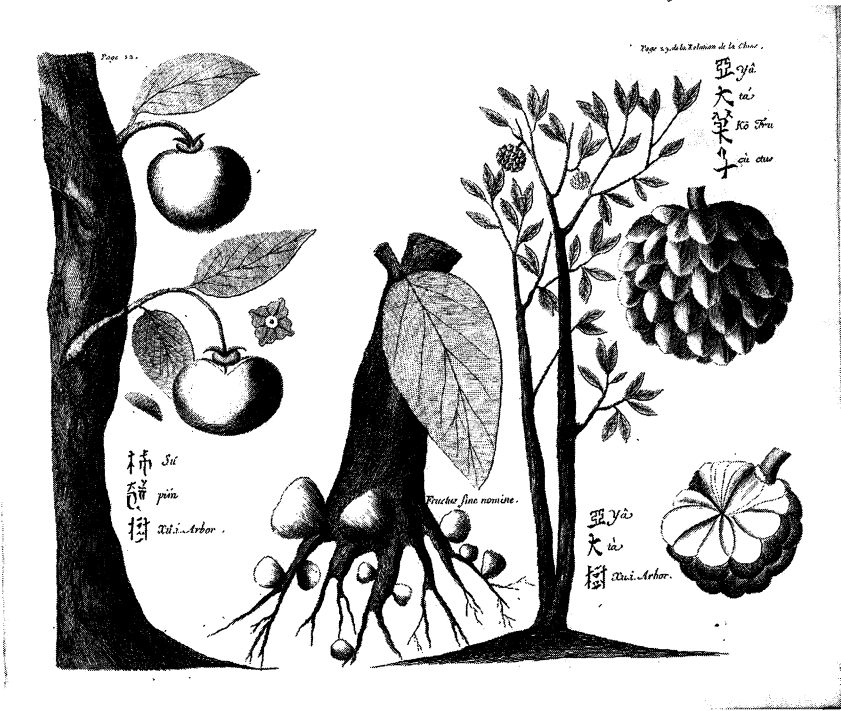


Fig. 212. Illustrations for three fruits taken from Boym's *Flora sinensis* and used by Melchisédech Thévenot in the second volume of his *Relations de divers voyages curieux* in the chapter 'De la Chine'. Besides the fact that three pages of Boym's book are merged into one, there are small changes, like the name *sine nomine* instead of *innominatus*.

('in particular excellent muscats'), pomegranates, walnuts, chestnuts and 'nearly all the other fruits of Europe'. He notices a difference between Mediterranean olives and those that he has seen but does not name, which are the fruits of the Chinese olive tree or canari, *gan lan*. He assumes that fruits that are the same as those in Europe are not as good as the latter because the Chinese have not learned the art of grafting.⁴⁰⁵ He mentions three kinds of melon, 'all admirable in their own particular way'. 'Some are small, yellow inside and sweet to taste and are eaten together with their skin'; he has only found this kind in Shaanxi (Shensi), the province where he lived.⁴⁰⁶ Others are large and long with flesh that is sometimes white and sometimes red, very juicy, refreshing and sweet, known as 'watermelons'. 'The third kind resembles our own ordinary melons'. Among the fruits that are unknown in Europe,

⁴⁰⁵ This seems an astonishing remark, given the evidence of the practice of grafting in the many texts already cited and also in view of what Lecomte himself writes about tea plants, for example.

⁴⁰⁶ Bretschneider (1880, p. 26) states that 'an excellent globular melon of the size of a small fist with a thin skin is also seen in Peking and known there under the name of 甜瓜 *tian gua* or 香瓜 *xiang gua*. The peel is yellow, or in another variety green'. This is probably a variety of muskmelons, *Cucumis melo* L. The large long ones with red flesh may be water melons.

he cites *létchis* (litchis), *lon-yen* (*long yan*, longans), and *sezes* (*shi zi*), kakis, which 'when one dries them like our figs, become floury and are gradually covered by a sweet crust that gives them an excellent taste'. Next, he is probably alluding to fruits mentioned in the *Flora Sinica* when he writes, 'I will not speak of the pineapples, the guavas, the coconuts and a number of other fruits that have come from the Indies and are already known in France thanks to the relations that we have established'. He then reminds the reader of the Chinese origin of the orange tree and the fact that it was introduced into Europe by the Portuguese, and he refers to 'the first and unique orange tree, from which, it is said, all orange trees came and specimens of which are still preserved in Lisbon in the house of the count of Saint-Laurent'.⁴⁰⁷ He goes on to mention the most prized oranges which 'are no bigger than a billiard ball', have a yellow-reddish skin that is thin, all of a piece and extremely sweet', although he himself considers large oranges to be even better. He admits that he does not know

how to tell them apart from those that we have in Provence and that originated in Portugal; perhaps they are firmer, with skin that is hard to remove neatly from the flesh and the flesh itself is not divided into little sections as in our kind, although to look at they seem hardly at all different.

Next, he writes of citrons, lemons and 'what, in the Indies, are called *pampelimouses* [pummelo or shaddock], which are very common'. He also mentions 'a particular kind of lemon tree, the fruits of which are the size of a walnut, perfectly round, green and bitter and excellent for all kinds of stews'. This is a variety of the Seville orange.⁴⁰⁸ He then cites the tree that he considers to be the most admirable, 'the one that produces tallow', with white flesh that surrounds the stone of the fruits, which, once melted, is used to make candles. This is the Chinese tallow tree.⁴⁰⁹ His next description, of 'the tree that bears pepper', makes it possible to identify it as the Chinese pepper tree, *hua jiao* 花椒. He only refers briefly to the kitchen garden plants, for 'there would be no end to it if details were given'. However, he does mention an onion that 'does not come from seeds . . . but at the end of the season one sees tiny filaments emerging from the tip or stems of the leaves, in the middle of which a white onion forms, similar to the onion that germinates in the earth'.

This is the first mention, in China, of the 'top onion',⁴¹⁰ which reproduces through little bulbs that grow in the air, above the ground. Bretschneider points out that such an onion is mentioned in the *Jiu huang ben cao* (Fig. 213a, b). As may be remembered, in the *Novus Atlas Sinensis*, Martini had reported that a water chestnut chewed with a piece of copper made the morsel edible. Lecomte, being unbelieving, made an experiment with 'a person with strong teeth' who managed to break the morsel into pieces, but he noted that

⁴⁰⁷ As I have already mentioned, the researches of Jose E. Mendes Ferrão (1992, pp. 167–72) show that the orange tree had been introduced in a number of places.

⁴⁰⁸ The modern name is *dai dai hua* 代代花, *Citrus aurantium* L. var. *amara* Engl.

⁴⁰⁹ *Sapium sebiferum* (L.) Roxb. ⁴¹⁰ *Allium cepa* L. var. *viviparum* (Metz.) Alef., *tou qiu yang cong* 頭球洋蔥.

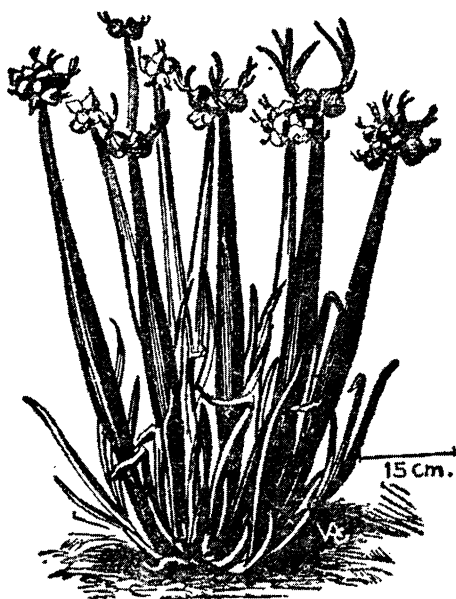
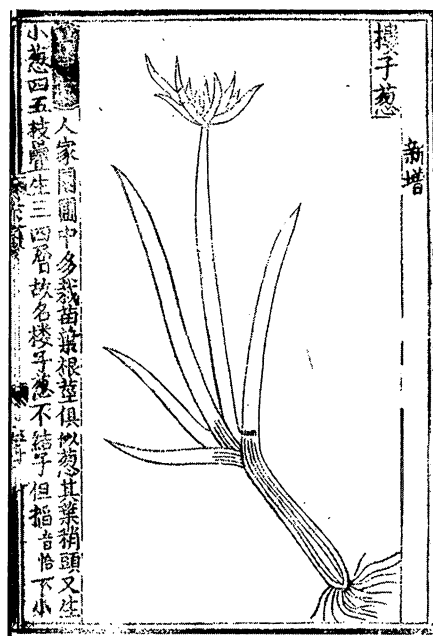


Fig. 213. (a) *Lou zi cong* 樓子蔥 ('two-storey chive') or 'top onion', from *Jiu huang ben cao* (1406, *juan xia*, 50a), in the category of 'vegetables where one can eat both the root and the leaf'. It is mentioned for the first time in a Western work in *Nouveaux mémoires sur l'état présent de la Chine* (1696), by Louis Lecomte. (b) Representation of *lou zi cong* in Wu Gengming (1957, p. 322, Fig. 104), under the name *tou qiu yang cong* 頭球洋蔥 ('onion with marbles at the head') (*Allium cepa* L. var. *viviparum* (Metz.) Alef.).

The morsels obtained from this double break-up remained extremely hard, which suggested to us that the only effect of the *Petçi* [*bi qi*] had been, by wrapping up the copper, to protect the teeth and give them more strength so as to break it up easily.

Having repeated the experiment several times, always with the same results, he concluded with the following words: 'one must listen to extraordinary things more than once before believing them, if one does not wish to be fooled'. Lecomte goes on to report that upstream from Nanking, the Yangzi 'forms many islands, all of which are very useful to the province on account of the multitude of reeds that grow there to a height of ten or twelve feet and that serve as heating material for all the surrounding towns'.⁴¹¹ At the end of this fifth letter, he describes various kinds of cloth, emphasising the fact that, alongside cotton, in the summer people use two particular tissues made from the fibres of two plants, a 'nettle' and 'a grass that the people call *co*, which is to be found in Fokien province'. What he calls a nettle is certainly the grass-cloth plant (*zhu ma* 苧麻),⁴¹² which bears a close resemblance to a

⁴¹¹ True rushes, *Juncus* sp., are all quite short, so these are probably *Phragmites* sp. reeds, or in this particular case may be *Phragmites donax* L., a reed that may reach between two and six metres in height. See anon. (1972-6, Volume 5, p. 48).

⁴¹² *Bohemeria nivea* (L.) Gaud.

large nettle and is used as the source of textile fibres in the same way as a second plant that we have already encountered, the *Pueraria* (*ge* 葛), the stems of which provide the raw material for Canton silk. At the beginning of Letter 6 he refers, without actually naming it, to the lacquer tree (*qi shu* 漆樹):⁴¹³ 'It was a mistake to think that varnish was a composition & a particular secret; it is a glue that drips from a tree more or less as resin does'. A little later, he describes a tree that attracts his attention as an ornamental plant and that appears here, for the very first time, in the writings of foreigners in China:

Among the other trees that could be used in gardens, there is one that is called *Outom-chu* [*wu tong shu* 梧桐樹], which resembles a sycamore. The leaves are long and eight or nine inches wide, attached to a stem one foot long; it is very bushy and bears bunches so dense that the sun's rays cannot penetrate them.⁴¹⁴ Its fruit, which is very small despite the tree being one of the largest, appears in the manner that I shall now describe. Toward the month of August, or at the end of July, there appear at the tips of the branches small clusters of leaves that are different from the rest. They are whiter, softer, not so broad, and more like flowers; on the edges of each of these leaves, three or four little grains appear, about as big as our peas, and these contain a white substance with quite a pleasant taste, rather like that of a hazelnut that is not yet ripe.⁴¹⁵ As this tree is beautiful & the manner in which it bears its fruit is quite extraordinary, I thought, Madame, that you might like to see the drawing of it that I have had engraved [Fig. 214].

In the eighth letter, which is concerned with various aspects of medicine, he has little to say except on the subject of two simples, tea and ginseng, and is otherwise content simply to stress the importance of Chinese *materia medica* in general. However, he does explain that he has brought back 'over four hundred drawings showing their colours and natural shapes, based on those that the Emperor has had painted for his collection', and he adds that Father Visdelou (1656–1737), one of the six Jesuits sent by the king of France to the emperor of China, 'is busy translating the *Chinese Herbal*'. We may logically assume that the source of the illustrations is the coloured manuscript of the *Ben cao pin hui jing yao*, as we shall see in the case of Father d'Incarville. As for the *Chinese Herbal*, this is certainly the *Ben cao gang mu*, as is clear from the translations cited in the book by Father du Halde.⁴¹⁶ The originality of Louis Lecomte's contribution is that he repeats very little from his predecessors; however, without citing them, he does mention Martini and Boym and completes their texts. In particular, he describes the ways in which the plants that he describes to his correspondents are used. In this he quite often seems like an ethnographer concerned about technical details.⁴¹⁷ It is

⁴¹³ *Rhus verniciflua* Stokes.

⁴¹⁴ That remark may well provide the etymology for the English and French names, 'Chinese parasol', *parasol chinois*, that are given to this plant, which is easily recognisable from this description.

⁴¹⁵ Lecomte (1990, p. 210).

⁴¹⁶ Bretschneider (1880, p. 33), on the basis of what Lecomte writes, also presumes that we owe these translations to Father Visdelou.

⁴¹⁷ A particularly remarkable example is provided by what he writes about Chinese ships, with regard to both their structure and the way that they function (see Lecomte 1990, pp. 282 ff.). My thanks go to my friend Pierre Séguy for having explained to me the technical aspect of this passage.

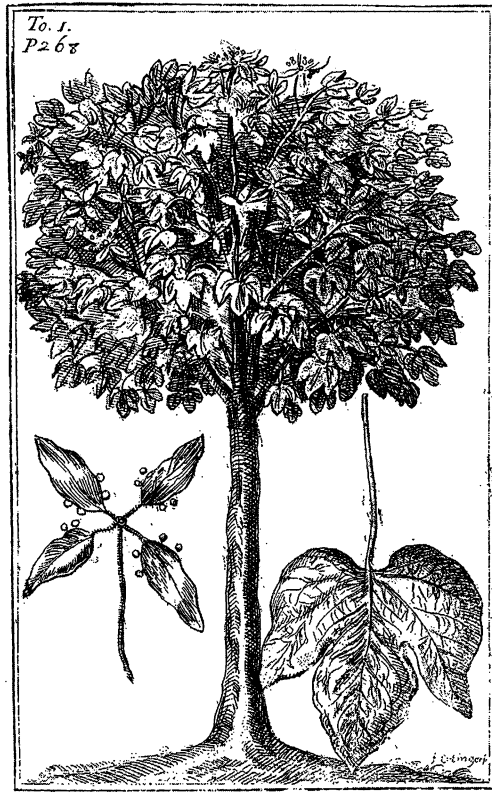


Fig. 214. *Outom-chu* (*wu tong shu* 梧桐樹, *Firmiana simplex* Wight), an early representation by Louis Le Comte (1696, Volume 2, p. 268). Reproduced with the permission of the Bibliothèque nationale de France, Paris.

important to remember that the details that he provides about plants were in response to a definite request. Before their departure for the Far East, the six members of the scientific mission had been received by the Académie des sciences and the plan was that they should collaborate with the Academy, as correspondents from abroad. Furthermore, Louvois had asked the academicians to prepare a memoir, which was entrusted to Father Couplet, who had returned from China in 1684, accompanied by a young Chinese, Michel Sin.⁴¹⁸ The memoir requested, precisely, that Louis XIV send and finance this religious and scientific mission. This text, entitled *Questions à proposer au R.P. Couplet sur le royaume de la Chine*, consisted of thirty-four rubrics on a wide variety of subjects, – history, geography, architecture, weaponry, manufactures and ways of life, including the natural and medical sciences. Three of the questions concerned plants:

⁴¹⁸ He was later to become the collaborator of Thomas Hyde in Oxford. See Elisseeff-Poisle (1978, pp. 93–4, n. 22), cited in Dumoulin-Genest (1994, p. 27). He ‘did useful work at Oxford, but died at sea on the way home’; see Spence (1989, p. 16).

- On tea, rhubarb and their other curious drugs and plants. Whether China produces some spices. Whether they use tobacco.
- On their ordinary foods and their drinks. Whether they have wine, bread, mills, Indian poultry, pigeons and doves, and wheat from India or from Turkey, etc.
- On the shape of houses, furniture, gardens, fruit trees, paths, fountains, floors, and the paving of their streets and the form and size of their temples, idols and sculpture.⁴¹⁹

In the course of the thirty years following the publication of the *Nouveaux Mémoires* (New Memoirs), the Jesuit missionaries continued meticulously to fill their correspondence with information relating to the various points included in this questionnaire and in particular on the subject of the useful plants that they had had a chance to see or whose effects they had appreciated when used as *materia medica*. One who deserves a mention was Dominique Parennin (1665–1741), who was the first to refer to *hia tsao tum chom*, *san ts'i* and *tam coue*, three *materia medica* products (soon to be identified), and also wisteria (*ten lo hoa*). A letter dated 6 October 1735 from Nicolas Fréret (1688–1749), a member of the Académie des inscriptions et des belles-lettres, had urged him to try to send the seeds of Chinese plants to France.⁴²⁰ In his reply, dated 10 November 1736, soon after receiving that letter from Fréret, he stressed the difficulty, if not near impossibility, of fulfilling that request.⁴²¹ However, he declared that he was trying to provide ‘something else of the same type’. What he did, in 1737, was send Fréret a memoir written entirely in Chinese, entitled ‘On the Botany of China’, which provided information about useful edible and ornamental plants. Each name was accompanied by its transcription in Latin and a short report noting its nature and its principal therapeutic and edible properties (Fig. 215). The second section of the text repeated the same entries but considered them from the agricultural point of view of the period for sowing. Father Parennin was not a transmitter in one direction only, for he translated the ‘Mémoires de l’Académie’⁴²² into Chinese, and Dortous de Mairans, a physician and mathematician, who was the Academy director and later became its secretary in perpetuity, published a series of letters that he had sent him and the replies to them in 1759, entitled *Lettres de M. de Mairan au R. P. Parrenin, missionnaire de la Compagnie de Jésus à Pékin, contenant diverses questions sur la Chine*.⁴²³

Those letters and many others were collected and published.⁴²⁴ It was on the basis of those documents that another Jesuit, Jean Baptiste du Halde, who never

⁴¹⁹ Dumoulin-Genest (1994, p. 28). Cited by Pinot (1932, p. 7); the complete text of this memoir appears in the same work, pp. 7–9.

⁴²⁰ Dumoulin-Genest (1994, pp. 32, 57, 79). ⁴²¹ Dumoulin-Genest (1994, p. 95).

⁴²² Vissière (1979, p. 358). ⁴²³ Cf Vissière (1979, pp. 358–410).

⁴²⁴ Emil Bretschneider (1880), pp. 28–32, extracted from them the ‘substantive marrow’ of a botanical point of view. See also Fournier (1932, pp. 41–5).

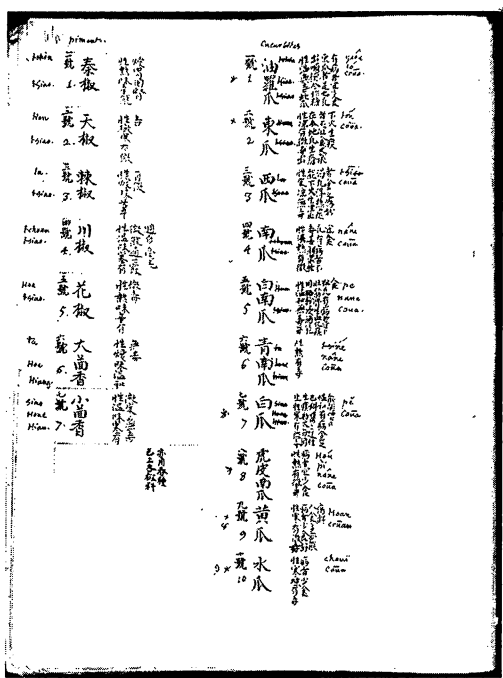


Fig. 215. ‘Piments/gua’, a page from the manuscript ‘Sur la Botanique de la Chine’ (On the Botany of China) by Father Parnnin addressed to Fréret in 1737, held at the Bibliothèque de botanique, Muséum national d’histoire naturelle (no call number available).

went to China, edited a *Description de l’empire de la Chine*⁴²⁵ (1735), in four volumes. As Bretschneider tells us, he also had access to unpublished materials, the purport of which is present in the book but the origins of which are mostly unknown as, although the authors who produced this documentation for the book are cited in the preface, precise references are not always given.⁴²⁶ This work is thus a work of synthesis of, on the one hand, knowledge acquired from the reported experiences of Jesuit missionaries resident in China and, on the other hand, Chinese knowledge contained in books several passages of which had been translated by some of those missionaries. The book as a whole contains a considerable amount of information, some parts of which relate directly to plants that are of nutritious, economic, ornamental or medicinal interest. The book thus repeats all the plants already mentioned in earlier writings plus some that are picked out more specifically. For example, page 17 of the first volume runs as follows: ‘Among the trees worthy of the public’s attention and capable of arousing the envy of Europeans, there are none more deserving than the four that I shall now mention’. The first of these is ‘the

⁴²⁵ The complete title is *Description géographique, historique, chronologique, politique, et physique de l’empire de la Chine et de la Tartarie chinoise enrichie des cartes generales et particulieres de ces pays, de la carte générale & des cartes particulieres du Thibet & de la Corée*.
⁴²⁶ See Bretschneider (1880, p. 33).

varnish tree *tsi chu* (*qi shu* 漆樹); the second is the *tong chu* (*tong shu* 桐樹), 'from which one obtains a liquid that resembles varnish'; the third 'is the one that contains tallow'; the fourth, which is the most rare, is called *pe la chu* (*bai la shu* 白蠟樹) – that is to say, 'the tree of white wax'. These can be successively identified as follows: the Japanese varnish tree; the tung oil tree,⁴²⁷ today known as *you tong* 油桐; the Chinese tallow tree; and the wax-insect tree.⁴²⁸ Immediately after these come 'the reeds that the Chinese call *tchou tse* [*zhu zi* 竹子] and that we Europeans call bamboos'. This passage then continues with woods for carpentry that are used for building: in the north, 'the pine for building' and, south of the Yangzi, the *cha mou* (*sha mu* 沙木/杉木);⁴²⁹ but the wood that is the most prized is the *nan mou* (*nan mu* 楠木),⁴³⁰ which is used for imperial buildings and is named 'Chinese cedar' in the writings of foreigners. For beauty, the most prized is the *tse tan* (*zi tan* 紫檀, the red sandalwood from the Indies/padauk),⁴³¹ 'which, at court, is called rosewood'. Finally the *tié ly mu* (*tie li mu* 鐵力木),⁴³² 'the wood of iron', is cited for its extreme toughness. Moving on to bushes, those that produce tea are the first to be cited. Next comes a tree that produces a fruit that provides an oil called *tcha yeou* (*cha you* 茶油). This is a species similar to tea tree, the *you cha* 油茶 or oil tea camellia.⁴³³ Noting the abundance of trees and bushes that bear fragrant flowers compared to those known to Europeans, the author cites only two, already known, that bear fragrant flowers: *mo li hoa*, the Arabian jasmine, and *kuey hoa* (*gui hua*), the osmanthus. He then notes that there is one plant with a fragrance even sweeter than those already mentioned, *lan hoa y* (*lan hua y*) or *lan ouey hoa* (*lan hui hua* 蘭蕙花); this generic term designates orchids of the *Cymbidium* genus. He also mentions 'a bush that bears even less relation to ours', the *ouen guang chu* (*wen guan shu* 文冠樹), yellowroot.⁴³⁴ Next he writes of the beauty of peonies, which are, furthermore, fragrant. Citing the *lien hoa* (*lian hua* 蓮花, lotus), 'flowers that the Chinese value highly . . . and cultivate with care', he notes that 'it is, however, likely that these are the flowers of water lilies or nymphaeas, which are not rated highly in Europe'. Among the edible plants, the first to be cited is a cabbage that 'does not form a head', which the author seems to distinguish from the *pe tsai* (*bai cai* 白菜, Chinese cabbage), which 'some people have assumed to be a kind of lettuce' and the taste of which he praises highly. By 'parsley' he means *chin tsai* (*qin cai* 芹菜), which is actually a celery,⁴³⁵ the various cultivars of which carry leaves with slender leaf stalks that remind one of a particularly large parsley plant. Next, he writes of the medicinal plants most valued by the Chinese, starting with rhubarb.

⁴²⁷ *Vernicia fordii* (Hemsl.) Airy-Shaw (= *Aleurites fordii* Hemsl.). See the description of this tree given by Li Shizhen (1975–81, Volume 3, p. 2000).

⁴²⁸ *Fraxinus* sp. and, often today, the Chinese ash, *Fraxinus chinensis* Roxb.

⁴²⁹ *Cunninghamia lanceolata* (Lamb.) Hook. To designate the tree, the character 杉 is read as *shan*, whereas when it refers to its wood the pronunciation is *sha*. See Luo Zhufeng (1986–94, Volume 4, p. 785). Another possibility is that chosen by Bretschneider (1880, p. 34), namely to transcribe *cha mou* by 沙木, a term that is synonymous with 杉木. See Cheng Junqing et al. (1992, p. 86), Fèvre and Métaillé (2005, p. 390).

⁴³⁰ *Phoebe nannu* (Oliv.) Gamble. ⁴³¹ *Pterocarpus indicus* Willd. ⁴³² ? *Mesua ferrea* L. See above, note 243.

⁴³³ *Camellia oleifera* Abel. Bretschneider identifies this name with *Camellia sesangua* (*Camellia sasangua* Thunb.), which is a distinct species, *chamei* 茶梅.

⁴³⁴ *Xanthoceras sorbifolia* Bunge. ⁴³⁵ *Apium graveolens* L.

Then he cites the *radix xina* (China root), which he likens to *fu'ling*, probably on the basis of what Michael Boym wrote about it. However, he also reports that certain missionaries in Shaanxi (Shensi) claim that the *bai fu ling* is a kind of truffle, and that they are quite right. The third is *fen se*, which Bretschneider somewhat doubtfully identifies with *fang ji* 防己.⁴³⁶ The next to be cited are *ti hoang* (*di huang* 地黃);⁴³⁷ *san tsi* (*san qi* 三七);⁴³⁸ and *tchangge-tse-chu*, 'the tree with long fruits' (*chang guo zi shu* 長果子樹), the pudding pipe tree.⁴³⁹ He explains,

We shall not here be mentioning the trees that produce betel . . . nor the palm trees, the banana trees, the cotton trees, the mangrove trees, the pineapple trees, nor several other plants that come from the Indies, since their descriptions are to be found in so many texts about those countries.

However, he does pause to consider the Chinese cinnamon tree (*rou gui* 肉桂).⁴⁴⁰ As for plants of technical interest, he cites only one, named *tien* (*dian* 靛) or *tien hoa* (*dian hua* 靛花),⁴⁴¹ which produces a blue dye. This term in fact has a generic sense covering several botanical taxa that designate plants from which an indigo dye is obtained:⁴⁴² *Isatis indigotica* Fort. (*da qing* 大青), *Baphicacanthus cussia* (Nees) Brem. (*ma lan* 馬藍), *Indigofera tinctoria* L. (*mu lan* 木藍), *Polygonum tinctorium* Ait. (*liao lan* 蓼藍) and *Isatis tinctoria* L. (*song lan* 菘藍).⁴⁴³ In the chapter entitled 'On the Fertility of the Land, on Agriculture, and on Respect for Those Who Devote Themselves to These', the description of plant produce continues. The theme of the diversity of fruits reappears, and we are told that in general in China there are

pears, apples, peaches, apricots, quinces, figs and grapes, mainly a species of excellent muscats; one finds walnuts, plums, cherries, chestnuts, pomegranates and nearly all the other fruits that are to be found in Europe, not to mention several trees that are not to be found there.⁴⁴⁴

A number of other fruits are then added to that list: various citrus fruits, melons, pineapples, guavas, bananas, coconuts, kakis, litchis and longans. In the mountains 'there are pines, ash trees, elms, oaks, species of palm, cedars & many others that are little known in Europe'. Kitchen garden plants get a very brief mention: 'Their kitchen gardens are well furnished with grasses, roots & vegetables of all kinds: apart from the species that we too have, they have many others not known to us and that are even better than ours'. Clearly, Father Du Halde is not attempting to produce a systematic inventory of the plants of China and, after citing a few plants, he often adds, 'if I say nothing about all the rest, that is because it is not my plan to produce a

⁴³⁶ Several plants correspond to this name for *materia medica*, all of them climbing plants. This identification seems unlikely since the characteristics described by Du Halde in the text are not those of a liana.

⁴³⁷ *Rehmania glutinosa* (Gaertn.) Libosch.

⁴³⁸ *Panax pseudo-ginseng* Wall. var. *notoginseng* (Burkill) Hoo & Tseng (= *Panax notoginseng* (Burk.) F. H. Chen).

⁴³⁹ *Cassia fistula* L. ⁴⁴⁰ *Cinnamomum cassia* Presl.

⁴⁴¹ Cf Luo Zhufeng (1986–94, Volume 11, p. 577). *Dian hua* 靛花 = *qing dai* 青黛.

⁴⁴² See p. 662 below for the analogous case of *lan* 藍 in Wu Qijun.

⁴⁴³ Cf *qing dai* 青黛, in Fèvre and Métaillé (2005, p. 365). ⁴⁴⁴ Du Halde (1735, Volume 2, pp. 142–3).

natural history of this empire; such an undertaking would take me too far and must be the subject of another work'. Nevertheless, he does provide many details about both the cultivation and the uses of plants that he finds interesting, such as ginseng, tea bushes and the tree 'that produces a fruit from which tallow is obtained', for which he for the first time provides the Chinese name, *ou kieou mou* (*wu jiu mu* 烏柏木), as he does also for 'the bush that produces cotton'. It is interesting that he mentions the *geu chu* (*gu shu* 穀樹), the paper mulberry tree, not for its classic paper use but on account of the use of its latex in gilding, for the application of gold leaf. The *lung ju gu* that he next cites is a tree that produces fruit that resemble cherries with a long stem, the flesh of which is used for the prevention of chilblains in winter. Bretschneider, suspecting a spelling mistake in the first syllable, suggests reading *kia ju tsz*, and so deduces that this is a cashew nut. Given the description that is provided in this text, that choice does not seem to me to be acceptable, particularly since cashew nuts are to be found in regions where the winters are not usually severe. One detail in the description, 'the stem to which the fruit is attached is extremely long and is divided into several strands at the end of each of which there hangs one of these little fruits', suggests to me that this is, rather, a species of cherry tree (Fig. 216),⁴⁴⁵ despite the fact that it is not possible to find a Chinese name corresponding to the transcription provided. The *mo lien* (*mu lien* 木蓮) is a fine ornamental tree resembling a magnolia.⁴⁴⁶ The next to be cited are other ornamental trees that, in the author's opinion, deserve to be introduced into European gardens, the *la moë* (*la mei*, the Japanese apricot tree), the *ou tong chu* (*wu tong shu*, the Chinese parasol) and the *tcha hoa* (*cha hua* 茶花, camellias).⁴⁴⁷ He ends by returning to the letter from Father Jartroux,⁴⁴⁸ dated 12 April 1711, on the subject of ginseng. The third volume contains a number of translations of Chinese works on *materia medica* that come from the early *juan* of the *Ben cao gang mu*. Judging from what Louis Lecomte writes and that is mentioned above, it would appear that they are the work of another Jesuit, Claude de Visdelou, one of the six 'King's Mathematicians' who arrived at Court in 1693, together with another of those 'Mathematicians', Jean de Fontanay (1643–1710).⁴⁴⁹ Unlike what, as we have seen, happened in Japan, out of the thousand plants contained in the original Chinese, here only a few are presented. The *materia medica* that is cited consists of ginseng, tea, *hia tsao tong tchong* (*xia cao dong chong* 夏草冬蟲), *san tsi* (*san qi*, rhubarb), the *tang coue* root (*dang gui* 當歸) and *ou kieou mou* (*wu jiu mu*). The *xia cao dong chong*, 'summer grass winter insect', today more logically named *dong chong xia cao*, is formed by a caterpillar (*Hepialus armoricanus*) fed on by a parasitic mushroom, *Cordyceps sinensis* (Berk.) Sacc.⁴⁵⁰ This is a Tibetan introduction into Chinese medicine. The *tang coué* root is that of an angelica, *Angelica sinensis* (Oliv.) Diels.

⁴⁴⁵ *Cerasus tomentosa* (Thunb.) Wall. Cf Yu Dejun (1982, p. 71). ⁴⁴⁶ *Manglietia fordiana* Oliv.

⁴⁴⁷ *Camellia* sp. ⁴⁴⁸ Cf Vissière (1979, pp. 176–7). ⁴⁴⁹ Collani (2001, p. 314).

⁴⁵⁰ Fèvre and Métailié (2005, p. 107).

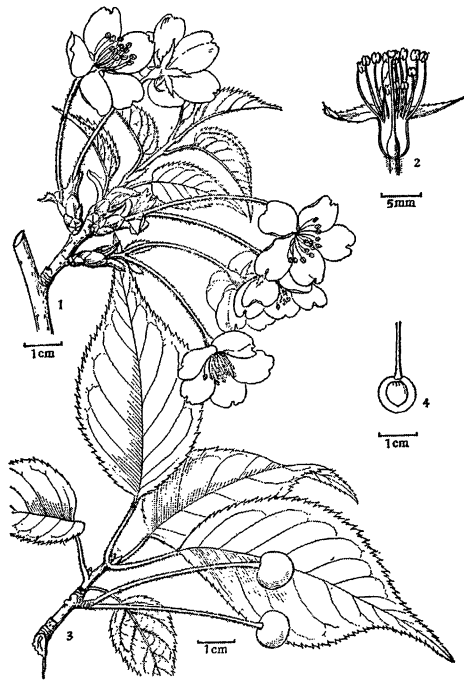


图 23 山 櫻 桃
1. 花枝 2. 花纵剖面 3. 果枝 4. 果纵剖面

Fig. 216. Cherry (*shan ying tao* 山櫻桃, *Cerasus serrulata* (Lindl.) G. Don), from Yu Dejun (1982, p. 66). Perhaps it is the *lung ju çu* mentioned in *Description de l'empire de la Chine* (1735, p. 148) by Father Du Halde.

With Pierre Le Chéron d'Incarville (21 August 1706–12 November 1757), we enter a new phase in the scientific activity of the Jesuits in the field of natural history. Whereas his predecessors were the 'King's Mathematicians' and correspondents of the Académie des sciences, he, for his part, had been trained as a botanist. He left from Lorient for China on 11 January 1740.⁴⁵¹ Earlier, he had spent four years in Canada, where he had studied at the College of Quebec. He had returned to France around 1735. Once he had been appointed to the mission to China, he endeavoured, from July 1739 onward, to increase his knowledge of the natural sciences under the direction of Jean Hellot (1685–1766), an expert in chemistry and technology, and Claude-Joseph Geoffroy (1685–1752), a chemist, botanist and master-apothecary, both of whom were members of the Académie des sciences.⁴⁵² He also spent time with Bernard de Jussieu⁴⁵³ (1699–1777) and those close to him,

⁴⁵¹ Bernard-Maître (1949, p. 7). See the full article for the biography of Father d'Incarville.

⁴⁵² Father d'Incarville was to become Geoffroy's correspondent in 1750.

⁴⁵³ After studying botany and medicine, in 1722 he became the assistant demonstrator of plants in the King's Garden in Paris. He favoured a natural method of classifying plants, which he put into practice in the

who included Antoine de Jussieu and Jacques François Vandermont (Vandermonde), a doctor who had lived in Macao from about 1721 to 1731 and had learnt Chinese. The latter had brought back to Bernard de Jussieu eighty mineralogical specimens of *materia medica* and had translated certain passages of the *Ben cao gang mu* that concerned minerals.⁴⁵⁴ Father d'Incarville arrived in Macao on 10 October 1740, and from there travelled to Canton, where he remained until 1741. Eventually he arrived in Peking in 1742 and was received at Court there, in his capacity as a master-glassmaker.⁴⁵⁵ He was to live there until his death in 1757. Before his departure for China, he had received a number of requests from Bernard de Jussieu, whom he regarded as his 'botany teacher',⁴⁵⁶ and from other enlightened enthusiasts. Upon his arrival, he decided that the best way of obtaining seeds of Chinese plants was for himself first to offer seeds to the Chinese, in a spirit of reciprocity. 'He hoped that above and beyond an ordinary business deal, there would be established between the gardens of the king and those of the emperor an exchange of seeds and services'.⁴⁵⁷ To this end, he did his best to obtain seeds from France in order to proceed to make exchanges (Fig. 217). Throughout his stay in China, he regularly sent Bernard de Jussieu packets of seeds, often backing up what he sent with supplies despatched by sea and overland through Russia, the better to guarantee their arrival. The notes recording the seeds that were sown, which are preserved in the Library of the Muséum national d'histoire naturelle in Paris, testify to the devotion with which Bernard de Jussieu systematically sowed the seeds that he received (Fig. 218). Furthermore, even before he arrived in China, during any stopovers, Father d'Incarville had collected plants, if possible together with their seeds, and also insects. He also began to put together an initial herbal to send to Bernard de Jussieu, which he despatched from Canton. On each page there appeared a number that indicated the geographical origin of the specimen and whether or not seeds had been obtained. If he had managed to gather seeds, he marked the packet containing them with the number attributed to the plant. In cases where he had been able to gather seeds only, he indicated this on their container. In a letter to Bernard de Jussieu written on 15 January 1741⁴⁵⁸ in Canton, in which, among other things, he told the latter that he was sending him the herbal,⁴⁵⁹ he wrote as follows:

I am keeping with me a second herbal, noted in exactly the same way as yours, as you did me the honour of recommending that I should do, so that you could be good enough to indicate to me the names of those that you recognised. If you have the time, I would be so

arrangement of the plantations in the flower beds of the King's Garden and, above all, at the Trianon in Versailles, where in 1759 Louis xv had appointed him supervisor. See Morton (1981, pp. 296–301).

⁴⁵⁴ Dumoulin-Genest (1994, p. 172, n. 5). ⁴⁵⁵ Bernard-Maître (1949, p. 13).

⁴⁵⁶ Cf d'Incarville (1812, p. 114), cited in Dumoulin-Genest (1994, p. 582, n. 3).

⁴⁵⁷ Dumoulin-Genest (1994, pp. 121–2).

⁴⁵⁸ The letter is preserved in the archives of the Académie des sciences in Paris, in the 'Adrien de Jussieu' collection.

⁴⁵⁹ This herbal contained 144 species; see Franchet (1882, p. 3).

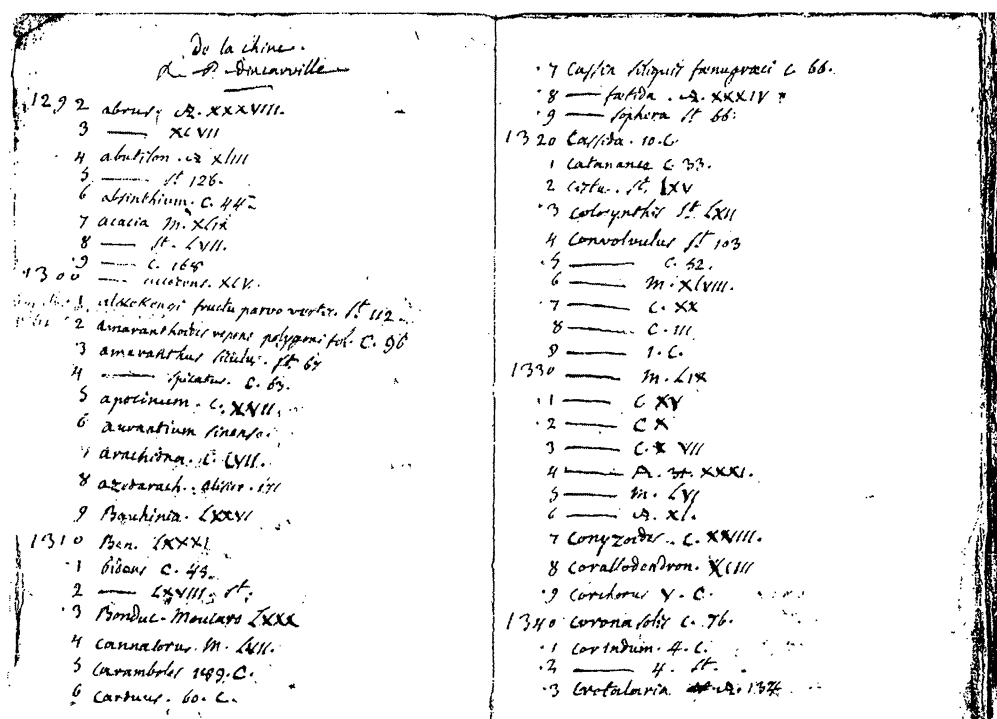


Fig. 218. Two pages from the seed-sowing notebook of Bernard de Jussieu (from 'De la Chine. R. P. Dincardville', Ms. 1877, 'Graines semées le 6 avril 1742, no 1292-1455', held at the Bibliothèque centrale du Muséum national d'histoire naturelle).

the Imperial Society of Naturalists in Moscow and that consists of a collection of short notes concerning plants, animals and minerals, taking the form of answers about the names of the natural objects classified alphabetically (Fig. 219).⁴⁶² In another letter, dated 10 October 1743, from Peking, he mentions having sent, via Canton, 'a little herbal relating to Peking',⁴⁶³ and he adds, 'You will not find in it very much that is new, for, as I had the honour of informing you, most of the plants in Peking are the same as those in France'. Although Laurent de Jussieu made some use of these herbals, they were not thoroughly analysed until more than a century after their arrival in France, when Adrien Franchet, who did so, wrote,⁴⁶⁴

One of the characteristic features of the collections of Father d'Incarville is that one finds in them each plant provided with its own label as well as a mention either of its common name

⁴⁶² This 'Catalogue' is a continuation of the one that he had produced in 1755 and entitled 'Catalogue alphabétique des plantes et drogues simples que j'ai vues en Chine, avec quelques observations que j'ai faites depuis quinze ans que je suis dans le pays' (Alphabetic Catalogue of the Plants and Simple Drugs That I Saw in China, Accompanied by a Few Observations That I Made in the Course of the Fifteen Years That I Spent in That Country). The manuscript, never published in France, is preserved in the Bibliothèque nationale de France, in Paris, in the Fonds Bréquigny, Volume 2, Carton 1, G, ff. 150-70. See Bernard-Maire (1949, p. 43, n. 150).

⁴⁶³ This second herbal contained 149 species; see Franchet (1882, p. 3).

⁴⁶⁴ Franchet (1882, pp. 3-4).

(45)

Framboise. * On dit qu'il y en a en Chine, j'en doute.

Fresne. ** Il y en a une espèce à Peking, dont on fait des
icheon meubles. On élève sur cet arbre une des espèces de
schun vers à soye sauvages, qui donnent la soye du *Kien*
tcheou. Voyez chêne.

Fromage. On ne fait en Chine que du fromage mou, qu'il
naitzeping faut manger le jour même qu'il est fait.

Froment Voyez blé.

Fumeterre. Il y en a à Peking à fleur violette, et à fleur

tsee hoa ti jaune. Les Chinois estiment cette plante, comme
ling. elle le mérite.

Fusain. Il est rare à Peking.

Fustel. J'en ai vû dans les montagnes proche de Peking.

ming hai ye
ho

G.

Galanga. On en trouve à Peking de beau, et à bon marché.

zeangkiang

Galles. Celles dont nous nous servons en Europe pour
 l'encre, et la teinture noire sont fort chères à Peking.
 On ne s'en sert pas en teinture, mais en médecine.
 Les Chinois y substituent une autre galle, qu'ils ap-
 pellent *ou poi tse*.

*) Rubus.

**) Fraxinus; on appelle quelquefois l'*Ailanthus glandulosa* frêne de la Chine.

***) Fumaria.

****) Evonymus.

*****) Rhus.

*****) Kaempferia Galanga, Alpinia.

Fig. 219. A page from the 'Catalogue alphabétique des plantes et autres objets d'histoire naturelle en usage en Chine, observés par le Père d'Incarville', from *Mémoires de la société impériale des naturalistes de Moscou*, Volume 3 (Moscou, 1812, p. 45).

in French or, sometimes, its Latin name, or even, more rarely, its Chinese name. Furthermore, remarkably enough at this date, the provenance of plants is accurately indicated; thus, in this particular little herbal, the collector has taken care to distinguish between the plants found in Peking itself and those that came from the mountainous region close to the town. The plants of Macao are also meticulously classified in separate categories. All these details show how careful Father d'Incarville was with his collections and the degree of confidence we may place in the information that he provides.

This author, like Bretschneider, regretted that these herbals had been neglected, for until he took an interest in them, a total of only twenty-five species had been studied. But he did add, 'all the same, it is true that types of most of the genera recognised and described by Monsieur Bunge in 1832 were already to be found in a French collection as early as 1740'.

As well as the immediately available plants that he gathered whenever he had the time to do so and that constituted the contents of his herbals, he was very keen to obtain the seeds of more rare ornamental plants. In a letter dated 17 November 1742,⁴⁶⁵ also sent from Peking, he told Bernard de Jussieu,

If you could send me some seeds, bulbs, and so on that we could present to the Emperor, that would be a way for me to make myself known at least as someone interested in flowers, and then as a botanist, and this might afford me a chance to see many plants that I might otherwise never see. The Emperor is fond of flowers; he has an apartment that is specially constructed so that he can see a little hill covered in chrysanthemums. There is an amazing number of them here, of many different colours, so that they create an effect similar to that of our ranunculi and anemones in Europe, with the advantage, however, that the flowers of chrysanthemums last for longer and appear here after all the other flowers are over.

In his own garden, he sowed seeds received from France so that he could gauge the degree of acclimatisation needed for the plants, before offering them as a gift. It was not until ten years later that, in a letter dated 26 October 1753, he was at last able to give Bernard de Jussieu the news that

my first letter contains a few seeds that I obtained from the Emperor's Gardens, where I may now enter at will, thanks to two plants of *mimosa pudica* that I offered to the Emperor, who was enchanted by them. He very much hopes that they will produce seeds . . .

Franchet also reported that a number of the seeds that Father d'Incarville had sent from China still remained in the Museum's collections. He then went on to say, 'The rest were the source of the Chinese plants that have been cultivated in the gardens for over a century. The *Polygonum tinctorium* L., *Calistepus chinensis* Nees, *Gleditschia sinensis* Lamk., and probably *Sophora japonica* are among them'. A fine example of this last species, produced from seeds sent by Father d'Incarville, is today among the remarkable trees in the garden of the Muséum national d'histoire naturelle in Paris. In September 1750, he sent a consignment of *materia medica* that included 188 plant products and twenty-seven minerals. At this point he established a 'Catalogue des drogues qui se vendent dans les boutiques des droguistes à Peking' (Catalogue of the Drugs That Are Sold in the Shops of Druggists in Peking).⁴⁶⁶ In this manuscript document he had placed a cross in front of whatever had been sent to Bernard de Jussieu and, using letters following the names – mostly transcriptions of the Chinese terms, the rest in French – he referred the reader to certain products listed in the pages of the two fascicules of illustrations from the *Ben cao gang mu* that

⁴⁶⁵ Archives of the Académie des sciences (Paris). The typed copies of the letters can be found in the Archives des Jésuites, in Vanves, fonds Bernard-Maître, JBM 44. See Dumoulin-Genest (1994, Volume 3. P. 567, 585).

⁴⁶⁶ Preserved in the library of the Laboratoire de Phanérogamie in the Muséum national d'histoire naturelle, in Paris.

he had sent to Bernard de Jussieu. The fact is that as well^f as engaging in the collection of plants and the exchange of seeds, Father d'Incarville had been asked to seek out Chinese books. Already in his letter cited above, dated 15 January 1741, he had written,

I have looked everywhere for the Chinese herbal that you wish for, and so have M. de Courcelles and M. Guerin. But I have been unable to find it. I am sending you all the paintings of flowers that I have found. A merchant in Nanking, where these kinds of flowers painted on wood are produced, has told me that he knows of those herbals and I asked him for them and even paid him in advance so as to be sure to obtain them, as our Fathers warned me that otherwise there was considerable risk of my not procuring them. We shall not be able to obtain this herbal until next year . . .

I have suggested that 'herbals' of this kind, made to order in a studio producing pictures, were composed as copies of the partial illustrations of plants and animals that appear in the 1640 edition of the *Ben cao gang mu*, brightened up by colours and accompanied by fragments of the original text, all put together to form a fine manuscript book.⁴⁶⁷ But upon consulting two of the copies that exist in French libraries,⁴⁶⁸ I found that these works were not at all scientific. The colours of the plants are in many cases arbitrary and vary for no reason from one copy to another, and the texts that accompany them are snippets from the original that are not particularly relevant. Furthermore, the arrangement of the pages does not correspond to that of the Chinese books (Fig. 220). Although, there is, at the moment, no evidence to prove that the manuscript in the possession of the Asiatic Society or the one in the Central Library of the Muséum national d'histoire naturelle were indeed ordered by Father d'Incarville, the remarks made by the latter do remind us, as Craig Clunas has deftly shown, that, in the ports of China that were open to international trade, there existed a market for Chinese paintings intended for foreigners.⁴⁶⁹ In the light of the very fine 18th-century painted illustrations from China, showing scenes of agricultural and artisan life that adorned the walls of certain European homes,⁴⁷⁰ it seems to me perfectly possible that the dynamism of merchant painters should have led them to add to their catalogues the Chinese Herbal, the *Ben cao gang mu*, in this 'reduced' form.⁴⁷¹ Meanwhile, just as the approximation and inexactness of the technical details in these paintings do not really impair the beauty of the books as a whole, these lovely illustrations of the *Ben cao gang mu*, even when accompanied by a no more than approximate text, still compose an exotic object that is quite luxurious and very original and that, furthermore, responded to a definite demand on the part of enlightened collectors. In support of this supposition, I base my remarks on the existence of another manuscript produced in Canton between 1766 and 1773 for John Blake, an overseer for the East India Company, a keen botanist and a correspondent of Sir Joseph Banks, to whom he supplied seeds for Kew Gardens. He commissioned a Chinese

⁴⁶⁷ See Métaillé (1998a; 1998b). ⁴⁶⁸ The Bibliothèque municipale of Dijon also possesses a very fine copy.

⁴⁶⁹ See Clunas (1984). ⁴⁷⁰ They are freely inspired by the *Geng zhi tu*.

⁴⁷¹ See Berger, Métaillé, Watabe (1996).

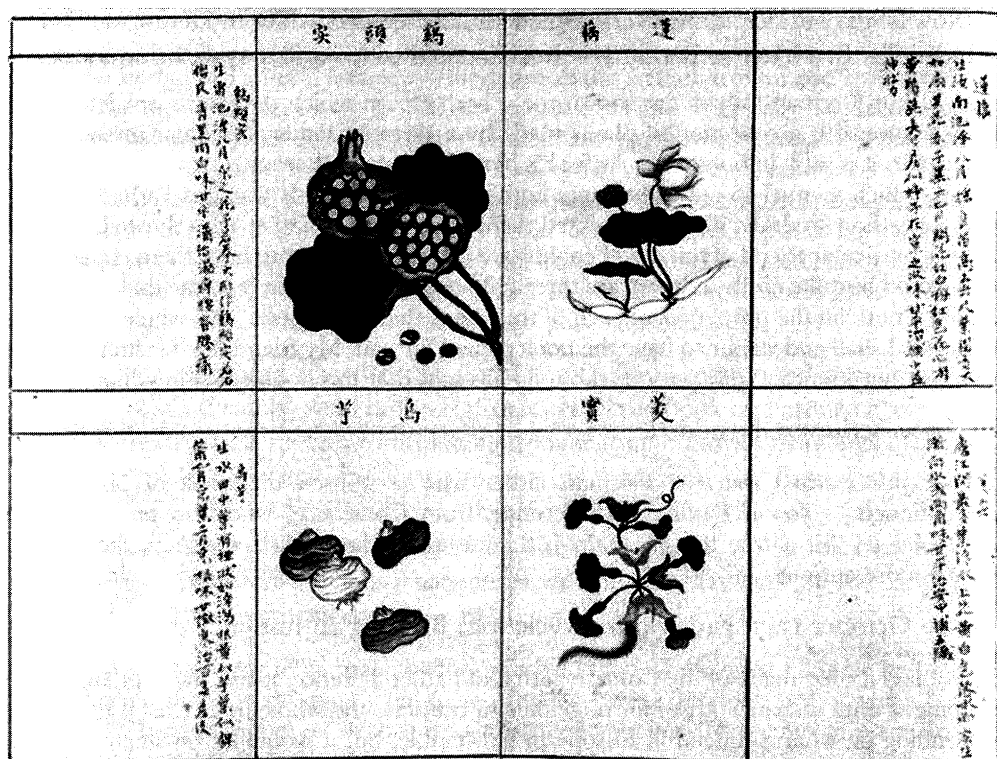


Fig. 220. A page of a manuscript inspired by the 1640 edition of the *Ben cao gang mu* (*Tu, guo bu, shui guo tu, juan zhong* 本草綱目圖, 果部, 水果圖, 卷中, 50a), probably sent to France by Father d'Incarville, in which are represented (from right to left, top to bottom): lotus (*lian ou* 蓮藕, *Nelumbo nucifera* Gaertn.), water caltrop (*ling shi* 菱實, *Trapa bicornis* Osbeck), water gorgon lily (*ji tou* 鷄頭, *Euryale ferox* Salisb.), water chestnut (*Eleocharis tuberosa* (oxb.) Roem. et Schult) (Ms B 36, f. 158, Bibliothèque de la Société asiatique, Paris).

artist by the name of Mauk Sow-U to produce some remarkable coloured pictures of plants and also a collection of illustrations of *materia medica* in three volumes.⁴⁷²

In another letter, dated 6 October 1742, Father d'Incarville announced,

I have found a book containing drawings of Chinese medicinal plants, a few animals and insects: really a book of natural history. The book has about fifty volumes, but I have by chance found two that contain plates that are quite well engraved, considering that they were done by Chinese.

That last remark testifies to his view of the quality of the illustrations, which are certainly those of the 1640 edition of the *Ben cao gang mu*, for they are clearly identifiable from the mention of the '50 volumes' of the text and the two volumes of plates. He must have found a copy of the work soon after, for in a post-scriptum to a letter dated 10 October 1743 he told Bernard de Jussieu that he was attaching to the parcel containing his Peking herbal 'the Chinese herbal that is mentioned in the history by Father du Halde, p. 437, vol. 30'.

⁴⁷² See Bunt (1963, p. 400).

Now let us consider a third work, which initially seemed rather mysterious to Father d'Incarville. In a letter to Bernard de Jussieu dated 2 November 1746, he announced,

One of our German fathers has shown me a herbal⁴⁷³ in which the plants are illustrated from nature; it is a collection of plants made by a German father, a scholar interested in particular, it is said, in botany . . . As for his herbal, I have only seen, cursorily, a few of the plants, which seemed to me to be quite faithfully represented. It was this Father himself, who knew how to draw, who had painted them. The German father who showed them to me is a particular friend of mine, so I could have the book in order to have them copied, but that would be quite costly, as there are three full portfolios; however, it is true that the father added a note on the properties of each of the plants that he painted. The whole work is in Chinese. I shall endeavour to have the book copied for you. My friend, the German father, told me that I am the only person whom he has told that this book exists in China . . .

In a post-scriptum, he added,

I have just learned that the German father who composed the book of plants that I mentioned to you is Father Jean Terence, from Constance, who also produced the *plinius indicus*; if it is true that he really is the author of the book in question, the book is all the more curious.

On 22 October 1747, Father d'Incarville told Bernard de Jussieu,

I have had a copy made of the Chinese herbal of Father Terence; it cost me a lot, and I am keeping it until a chance arises for me either to translate the whole or at least a part of it, depending on what is judged in Europe to be suitable; but it would be no small task and I doubt whether it will be considered worth the expense. I should need two years just for that, with a clever member of the literati, who would have to be paid large wages . . . I possess two copies of the paintings of the plants, which are illuminated with their natural colours; when the war is over, I shall send you the second copy so that you can decide for yourself whether it is worth translating the whole thing into a European language. The first copy, being in Chinese, would be useless to you. If I had put off having two copies made, I very much doubt that I should have had a chance to finish it. Had our general superior R.P. not died, he planned to send a copy of this herbal to the King's library. If God grants us the time, we shall be able to do that in his stead.

At this point, let us pause, for this letter provides important information regarding the nature of the copies that he had arranged to be made. The two copies are not the same, for one is complete, with a voluminous text for which a translation would, it is estimated, take two years of work, with the aid of a Chinese scholar, whereas the other reproduces only the plant illustrations. One year later, on 11 November 1748, reminding Bernard de Jussieu that he has had 'the Chinese Pliny of Father Terence' copied, he writes again, as follows:

When I can, I will send you a copy of the plants that are drawn in it; I have it to hand. If you are only curious to know what Father Terence had to say about them, all of which can be found in the best Chinese authors, I could satisfy you, provided that there are not too many of them. In order to do so I should have to work with a Chinese scholar.

⁴⁷³ Here, 'herbal' does not carry the modern sense of 'collection of specimens of dried plants', but rather that of a work of natural history and *materia medica*.

In 1751, in a letter dated 3 November, he returned to the subject yet again:

As for the herbal of Father Terence . . . there are in this herbal around 400 kinds of plant used in Chinese medicine. I have looked carefully at this book. It is really a collection of all the plants that are sold by druggists. Many of them are not drawn from nature, but simply following the description given by the Chinese books that refer to these plants. I wish I could send you a translation of the Chinese explanation along with drawings of the plants, but quite apart from the fact that that would cost me at least one hundred pistols for the scholar who would help me with the translation, I do not know enough about medicine; I should be at a loss, in many cases, even for the terms to use. The explanation to which I have referred seems clear and methodical; it is a quite detailed pharmacopoeia.

That last sentence and likewise the number of plants mentioned are bound to remind us of what can be read in the eighth letter of the book by Father Lecomte, in which he reports that he has commissioned 'over four hundred drawings of plants with their colours and natural forms, based on those that the Emperor has had painted for his cabinet'.⁴⁷⁴ Finally, another note further describes the nature of the copied work. Under the entry 'Root' in the 'Catalogue . . .' published in the *Mémoires de la Société Impériale des naturalistes de Moscou* (Memoirs of the Imperial Moscow Society of Naturalists),⁴⁷⁵ we read,

This herbal seems to me to be much better organised than all the other Chinese herbals. It has not been printed. In Peking, there are only three copies of this book, one of which I have had copied. It cost me a great deal. It runs to sixteen volumes. The plants in it are drawn and painted in colours.

This can only be the coloured manuscript of the work on *materia medica* commissioned by Emperor Hong Zhi that had been compiled under the direction of Liu Wentai and presented to the throne in 1505, the *Ben cao pin hui jing yao*. In his various letters, Father d'Incarville makes only one mistake, when he attributes to Johann Schreck, 'Terence', the paternity of this work, when in fact the latter had simply made a copy of the manuscript. The display of drawings that he had had produced for Bernard de Jussieu can today be found in the Library of the Paris Institut.⁴⁷⁶ It was sent to France after the death of Father d'Incarville and arrived there after 1772 and before 1777.⁴⁷⁷ In circumstances that are not known to us, this manuscript was used by Joseph Buc'hoz (1731–1807), 'the Doctor of Monsieur', the king's brother, who exploited it for personal purposes, publishing first a *First [and also a Second] Century of Illuminated and Non-illuminated Plates Representing the Natural State of the Most Interesting and Curious Animals, Plants and Minerals to Assist the Understanding of the General History of the Three Kingdoms of Nature*. This contained engravings in an in-folio format made on the basis of the drawings that Father d'Incarville sent to Bernard de Jussieu. They are arranged in fascicules of ten, each of which forms a 'decade',

⁴⁷⁴ See p. 613 above.

⁴⁷⁵ See Le Chéron d'Incarville (1812–13, Volume 4, p. 74). Bernard-Maître (1949, p. 28) cites this passage from the manuscript of the 'fonds Bréquigny' preserved in the Bibliothèque nationale de France; see note 462 above.

⁴⁷⁶ For the trail that led me to this discovery, see Métaillé (1998a). ⁴⁷⁷ See Métaillé (2003).

(a)

(b)



Fig. 221. Copies of three illustrations from the *Ben cao pin hui jing yao*, made from reproductions ordered by Father d'Incarville. These plates, in black and white, 'non-illuminated' (a) and in colour, 'illuminated' (b), were offered for sale by Joseph Buc'hoz in the form of 'centuries', which included ten series of ten double plates or 'decades'.

which in fact consists of two sets of ten engravings. Each engraving appears on a left-hand page, in black, 'non-illuminated' and, opposite, on the right-hand page it appears 'illuminated'; that is to say, embellished with colours (Fig. 221a, b). At the end of each fascicule, the author provides a list of the names of the plants that are depicted on each of the plates. These names are given in Chinese characters, accompanied by a transcription in Latin letters (Fig. 222). The images were reproduced in a reduced format in another book published by Buc'hoz, who claimed paternity of them. This book was entitled *Herbal or Collection of Medicinal Plants from China* ... This in-folio contained a title page followed by two pages entitled 'An Explanation of the Plates', followed by 100 plates, each of which bore three engravings, with the exception of three, which carried four. What is remarkable is that the Chinese plates represented are identified only by transcriptions of their Chinese names,⁴⁷⁸ which in truth are the only 'Explanations' offered by this

⁴⁷⁸ My warm thanks go to Ad Dudink who, in a letter dated 24 June 2004, told me that certain botanical identifications of Chinese plants appear in another book by Buc'hoz, *Le grand jardin de l'univers où se trouvent coloriés les plantes les plus belles, les plus curieuses et les plus rares des quatre parties de la terre, formant la continuation de l'Herbier de la Chine, de la Collection des Fleurs de la Chine et de l'Europe, des Dons Merveilleux* ... Paris, chez l'Auteur 1785, 2 vols.

another, named *lin-kio* (*ling jiao* 菱角), which also grows in Europe; *lien kien* (*lian qian* ??蓮芡) or *ki-teou* (*ji tou* 雞頭), the Euryale or prickly water lily/gorgon plant; *kiu-hoa* (*ju hua* 菊花) or 'Chinese feverfew', the chrysanthemum; *Mou-tan* (*mu dan*) or 'peony, Chinese shrub'; *yé xiang-hoa* (*ye xiang hua* 夜香花), 'flower that perfumes the night';⁴⁸² *pé-gé-hong* (*bai ri hong* 百日紅), 'one hundred days red'⁴⁸³/thitmin; the jujube tree; the oak; the chestnut tree; and finally the 'orange-quinces' which are quince trees grafted onto large orange trees. A few notes in Volume 11 are also devoted to plants (we shall be returning to those). Bretschneider counted a total of thirty-five named plants. Finally, we should cite the *Description générale de la Chine*, which appeared in 1789, written by Abbé Grosier (1643–1723). Articles v, vi and vii of Book iv, *The Natural History of China*, are entitled, respectively, 'Fruits, Vegetables, and Pot-Herbs of China', 'Trees, Bushes and Plants of China' and 'Herbs and Medicinal Plants of China'. However, in the course of 150 pages, the author does no more than repeat his predecessors, often quite literally, in particular du Halde's *Description* and various passages from *The Memoirs . . . of the Missionaries of Peking*. Nevertheless, the very regrouping of all this information turned the work into a practical and handy tool for anyone interested in the plants of China. Setting aside the strictly botanical work of Father d'Incarville, it is clear that the contributions of the Jesuit missionaries provided knowledge limited to plants that were either edible or of economic or ornamental interest. That is, no doubt, understandable, given that most of them were not botanists and, even if they did possess some botanical knowledge, their very status generally prevented them from botanising freely.

* * *

The era of plant collectors, whether professional botanists or simply passionate amateurs, started with James Cunningham (or Cunninghame) (active 1695–1701), a Scottish doctor working for the East India Company.⁴⁸⁴ In 1698, he was sent out to Amoy, as doctor to the English factory there.⁴⁸⁵ A brief stay there made it possible for him, in 1699, to bring back to England drawings of close on 800 plants. He returned to China in 1700, to the island of Chusan, from where he sent back seeds and specimens of dried plants.⁴⁸⁶ He divided his collections between James Petiver (c.1663–1718), apothecary of the Charterhouse, London, and fellow of the Royal Society, and Leonard Plukenet (1642–1705), an English botanist who published a description of around 400 Chinese plants in his *Almatheum botanicum seu Stirpium Indicarum alterum copiae comu* (1705). As Bretschneider comments, 'on the whole, nearly 600 Chinese plants have been described by Petiver and Plukenet from Cunningham specimens'.⁴⁸⁷ Another notable contribution to 18th-century knowledge about the Chinese flora was made by Swedes who were close to Linnaeus. The first collection

⁴⁸² *Telosma cordata* (Burm. F.) Merr. ⁴⁸³ *Podocarpus neriifolius* D. Don.

⁴⁸⁴ Jellicoe, Goode and Lancaster (1986, p. 133). ⁴⁸⁵ Bretschneider (1880), p. 37.

⁴⁸⁶ Jellicoe, Goode and Lancaster (1986, p. 133).

⁴⁸⁷ See the analysis of the various studies on the plants collected by Cunningham in Bretschneider (1880), pp. 46–88.

of plants was made in the Canton area between 21 August 1751 and 5 January 1752 by a student of Linnaeus's, Peter Osbeck (1723–1805), who had travelled there as chaplain on the *Prince Charles*, a ship owned by the Swedish East India Company. When he returned to Sweden, he gave the plants that he had gathered to Linnaeus, who described and named them. In the account of his journey that Osbeck published in 1757,⁴⁸⁸ he mentions 244 Chinese plants, which are given their Linnaean binomes and in some cases also their local name in a transcription of the Cantonese, which is not easy to decipher.⁴⁸⁹ Another naturalist, a sea captain, Charles Gustavus Ekeberg (1716–1784), arrived in 1766 in Canton, where he proceeded to make observations on the basis of which he produced a book, likewise translated into English by Foster and published along with Osbeck's account of his voyage, under the title *Chinese Husbandry*. This is not, strictly speaking, botany, but it contains information comparable to that provided by the writings of the missionaries, relating to various cultivated plants. Linnaeus credits him with being the first to introduce a tea plant into Europe.⁴⁹⁰ A small collection of twenty or so species of Chinese plant was also put together in 1766 by another Swedish botanist and traveller, Andreas Sparrmann, who had accompanied Ekeberg on his voyage; these too were described and named by Linnaeus.⁴⁹¹ Another Swede, Magnus von Lagestroom (1696–1759), played a role of some importance, not in the collection of plants but in their introduction from East Asia. He was the director of the Swedish East India Company in Göteborg, and set out to procure rare natural products from India and China, which he then offered to Linnaeus, who was a friend of his. He apparently possessed a copy of the *Ben cao gang mu* and had received from China a collection of 1,000 *materia medica* products.⁴⁹² Linnaeus honoured all these amateurs and suppliers of plants by bestowing their names upon some botanical genus, the best known being certainly *Lagestroemia*, which designates the Indian lilac, a little tree whose supposed reaction to tickling was used as an argument by Li Yu to prove the sensitivity of plants.⁴⁹³ Pierre Sonnerat (1745–1814),⁴⁹⁴ a French traveller and naturalist, left in 1768 for the Île de France, now Mauritius, where a relative of his, Pierre Poivre (1719–86), was the administrator. He spent most of his life travelling,⁴⁹⁵ and between 1774 and 1781 visited India and China. It was a journey that he wrote about in a work that was published in 1782 and was entitled *Voyage aux Indes Orientales et à la Chine ...* Bretschneider humorously remarks, 'All that I can gather with respect to Sonnerat's voyage to China is in the title of this book'. Nevertheless, there appears to be no doubt that he did visit Canton. The second volume of the *Voyage* contains a description and

⁴⁸⁸ This text, published in Swedish with the title *Dagbok öfver en ostlindisk resa*, was translated into German by J. G. Georgi, professor of mineralogy at the Academy of St Petersburg. An English translation of this German translation was produced by J. R. Foster, a travelling companion of Captain Cook; see Bretschneider (1880, p. 89).

⁴⁸⁹ See Bretschneider (1880, pp. 91–115) for the list of these species, completed by the names of fifty-six plants added by Foster in 1771, plus the names forgotten by Foster. In this way Bretschneider drew up a list of 319 taxa.

⁴⁹⁰ See Bretschneider (1880, p. 118). ⁴⁹¹ The list appears in Bretschneider (1880, p. 119).

⁴⁹² Bretschneider (1880). ⁴⁹³ See p. 286 above.

⁴⁹⁴ For biographical notes, see Davy de Virville et al. (1954, p. 119); Ly-Tio-Fane (1976).

⁴⁹⁵ Cf Gerard (1869, p. 237).

illustrations of three Chinese plants; and in Volumes 1, 3, 4^s and 5 of Lamarck's *Encyclopédie méthodique: Botanique*, there are mentions of a dozen or so other plants,⁴⁹⁶ which, the author expressly tells us, come from China and have been drawn to his attention by Monsieur Sonnerat. Unlike the title of Sonnerat's book, the work by Joannis [Joao] de Loureiro (1715–91), a Portuguese Jesuit, *Flora Cochinchinensis* (1790), does not refer to China; however, the author, who from 1742 onward spent thirty-six years in Cochinchina, in Hue, as a mathematician and naturalist in the service of the king,⁴⁹⁷ travelled well beyond the frontiers of what is now Vietnam, and descriptions of numerous Chinese plants are to be found in his *Flora*. That is not at all surprising since from 1777 onward he spent three years in Canton. Bretschneider notes that of the 1,257 plants described in this work, 539 are species from China. He also draws up a list of these plants, adding to them those that Loureiro found only in Cochinchina but were later also discovered in China; in all, he cites 880 taxa.⁴⁹⁸ In a letter dated 22 December 1782, preserved in the Central Library of the Muséum national d'histoire naturelle in Paris, Sir Joseph Banks, while returning the manuscript of this flora entitled *Nova Genera Plantarum*, which Loureiro had lent him in the hope that he would publish it, justified his decision not to do so, 'observing that 3 parts in 4 of your new genera were constituted of plants well known to botanists both generically and specifically . . . I dare not publish in the shape in which I received it'.⁴⁹⁹ It is not known to what extent Loureiro took Banks's remarks into consideration before publishing his flora in Lisbon eight years later. However, Bretschneider's verdict on the book was on the whole positive: he appreciated the fact that the author had worked by observing the described plants directly, that he also provided information about their economic uses and their medicinal virtues, and in particular that he provided correct transcriptions of their Cantonese names.⁵⁰⁰ Bretschneider considered, quite rightly, that 'Loureiro occupies without doubt one of the most prominent places among the botanical collectors of the last [19th] century'. However, unknowingly agreeing with Banks, he also remarked that

a great part of Loureiro's plants, in particular those from Cochinchina, are still known only from his description, although they are probably very common in that country. It may be also that many Loureirian species relegated by botanists among the species dubiea are known under other scientific names. From the diagnoses alone given by L., without examining the original specimens, it is impossible to identify them.⁵⁰¹

The appositeness of this point of view was confirmed by the American systematicist botanist Elmer Drew Merrill (1876–1956), who considered that the *Flora Cochinchinensis* was one of 'those types of publications that have caused much trouble to systematicists who have attempted to monograph various groups of plants', on

⁴⁹⁶ Cf Bretschneider (1880, p. 129).

⁴⁹⁷ Merrill (1946, pp. 249–51); on the subject of his biography see also Bretschneider (1880, pp. 129–32).

⁴⁹⁸ See Bretschneider (1880, pp. 135–84). It should be noted that Merrill (1946, p. 252), for his part, counts 254 Chinese species and 292 that are common to both China and Cochinchina.

⁴⁹⁹ Cited in Métaillé (1994b, pp. 167–8, n. 25). ⁵⁰⁰ Cf Bretschneider (1880, pp. 132, n.).

⁵⁰¹ Cf Bretschneider (1880, pp. 132, 133).

account of the impossibility of referring to the herbals prepared by Loureiro, which had been partially destroyed.⁵⁰² Merrill therefore decided

to make a rather intensive study of all of his descriptions with a view to placement of his binomials, as far as they can be placed in the light of our present knowledge, in relation to those proposed by other authors, and at the same time to attempt to account for the very numerous binomials proposed by later authors but based on Loureiro's descriptions.⁵⁰³

Finally, in conclusion to his own investigations, Merrill wrote,

As contrasted to the present status of Blanco's genera and species, Loureiro stands about as follows: four genera based by later authors on Loureiro's descriptions, quite unknown; about 23 species that cannot be placed in their proper families; and about 140 additional ones that cannot be correlated with those of other authors, of which about 80 can be placed in their proper genera and about 60 are doubtful as to their generic position. Over 1100 can absolutely be placed as to their species. These figures include all species that Loureiro characterised under binomial names, whether described as new or correctly or incorrectly ascribed to Linnaeus, and include 55 cellular cryptogams so inadequately described that only two or three are actually identifiable from the descriptions.⁵⁰⁴

Finally, after all this work, taking into account the synonyms that Loureiro had not noticed, he reduced the total number of species described in the *Flora Cochinchinensis* to 1,157, 100 units fewer than Bretschneider's calculation.

Soon after the publication of Loureiro's flora, Joseph Banks,⁵⁰⁵ since 1780 the president of the Royal Society, in London, was making preparations for the naturalist aspect of the embassy of Lord Macartney (1737–1807) to the Emperor Qian Long, in China. On the basis of the writings of missionaries and, in particular, Lecomte's *Nouveaux mémoires*, he had composed a note entitled 'Hints on the subject of Gardening to the gentlemen who attend the embassy to China', in which he identified what the people responsible for collecting plants might find in the various regions of China.⁵⁰⁶ The circumstances surrounding the English embassy's travels in China hardly favoured chances to collect plants freely. Plants of 400 species nevertheless were collected in the course of the peregrinations of the members of this embassy.⁵⁰⁷ Two gardeners had been attached to the embassy. The places where plants could be gathered bordered upon the long route from Peking to Jehol (Chengde), the summer residence of the emperor, and were in Shandong, Jiangnan (the provinces of Jiangsu and Anhui), Jiangxi and Guangdong. Bretschneider provides an exhaustive list of the plants' names.⁵⁰⁸ Soon after the visit of Lord Macartney, the Dutch East India Company likewise sent an embassy to Emperor Qian Long. Andreas Everard Van Braam (1739–1801), who had acted as company overseer in Canton and Macao from 1758 to 1774, took part in this mission as second-in-command. He himself possessed an important collection of plant illustrations. In 1797–8, he published in Philadelphia an illustrated account of them,

⁵⁰² Cf Merrill (1946, p. 243). ⁵⁰³ Merrill (1946, p. 244). ⁵⁰⁴ Merrill (1946, pp. 254–5).

⁵⁰⁵ On Joseph Banks, see Cameron (1952), Carter (1988), Banks et al. (1994). ⁵⁰⁶ Métaillé (1994b, p. 165).

⁵⁰⁷ Bretschneider (1898b, p. 162). ⁵⁰⁸ Bretschneider (1898b, pp. 163–83).

written in French, and in 1821 a series of thirty-two plates of plant illustrations were extracted from this and published.⁵⁰⁹ Banks's role as adviser to the directors of the East India Company enabled him to request that seeds and young plants be carried back to England aboard the company's ships. He also managed to send gardeners along to care for the plants during the return journeys. Thanks to his position as adviser also to George III, he held an influential position in the royal gardens at Kew, where he could supervise the acclimatisation of these exotic plants. Between 1780 and 1817 he was thus either directly or indirectly responsible for the introduction of about fifty species of Chinese plant that were either ornamental or of economic interest;⁵¹⁰ that is to say over half of all the plants that were introduced into Kew Gardens during that period.⁵¹¹ This was certainly not simply by chance. The fact is that, although his interest was by no means limited to China, he was particularly interested in the Chinese civilisation and, as well as collecting plants, he ordered notes to be kept on the techniques used for cultivating or transforming them. In January 1792 he had written to Lord Macartney as follows: 'The Chinese appear to me to possess the Ruin of a State & Civilisation in which when in Perfection the human mind has carried all Kinds of Knowledge to a much higher Pitch than the Europeans have hitherto done'.⁵¹² It is with this key figure in European scientific life over a period of forty years (1780–1820) that I shall bring to a close this chapter relating to the discovery of the richness of plant life in China. In the 19th century, when it became easier for foreigners to reside in various regions in China, the situation was to change considerably and a direct exploration of vegetation became possible. The history of that period has already been well documented, so I will at this point simply refer the reader to two fundamental texts. The most recent work that promotes an understanding of the methods adopted by Westerners interested in plants from the 18th century to the Opium War on the one hand and, on the other, up until the fall of the Chinese empire in 1911 is *British Naturalists in Qing China* (2004) by Fan Fa-ti, which places the quest for Chinese plants on the part of foreigners within the political contexts of those two periods. With the exception of Jesuit missionaries such as Father d'Incarville, as we have seen, foreigners were at first confined to ports and so could obtain plants only through the intervention of official representatives of merchant guilds. Then came a later period when 'naturalists', who might be passionate amateurs, merchants, diplomats, missionaries or travellers or, alternatively professional botanists or plant-hunters, were allowed to reside and circulate in the interior of the country and undertake botanical explorations there. A study of the above book is an indispensable prelude to reading other texts that address specific subjects or genera, particularly since its abundant notes refer to a wide range of other works. Accordingly, since the subject of that work is specifically British naturalists, I shall now mention just a few complementary references such as *Voyages et découvertes scientifiques*

⁵⁰⁹ A list of their scientific names, identified by Hemsley, appears in Bretschneider (1898b, pp. 186–9).

⁵¹⁰ Bretschneider (1898b, pp. 163–83). ⁵¹¹ Bretschneider (1898b, pp. 191–200).

⁵¹² Cited in Carter (1988, p. 291), and also Métaillé (1994b, p. 165).

des missionnaires naturalistes français à travers le monde (xve à xxe siècles) (1932) by Pierre Fournier, *Journal de mon troisième voyage d'exploration dans l'empire chinois* (1875) and *Notice sur quelques services rendus aux sciences naturelles par les missionnaires de l'Extrême Orient* (1888) by Father David. To these I add one more title, *Wilson China: A Century On* (2009) in which the authors, Mark Flanagan and Tony Kirkham, following, one century later, in the footsteps of the famous plant-hunter Ernest Henry Wilson (1878–1930) in Sichuan, present juxtaposed photographs of the sites as they were when Wilson saw them and as they were one hundred years later. To render these images even more immediate, I would suggest a parallel reading of *A Naturalist in Western China*, which Wilson published in 1913 and upon which the book written by Flanagan and Kirkham is based.⁵¹³ This gives one a good idea of the environment from which came so many of the ornamental plants to be found in contemporary gardens both European and American. With regard to botany *stricto sensu*, Emil Bretschneider's *History of European Botanical Discoveries in China* (1898), already copiously cited, remains the indispensable bedrock. The two volumes of this text cover a wide range of work, for each figure that played a role in creating an inventory of the Chinese flora is presented, along with a list of the names of the plants discovered by him. The scientific binomes are always presented in the forms in which the authors gave them and, in many cases, Bretschneider adds the synonyms that he has found in the course of his bibliographical research. In this way, Bretschneider and, over a century later, Fan Fa-ti together offer the best key to a follow-up to the present chapter.

(2) THE INFLUENCE OF CHINESE GARDENS ON EUROPE

In an attempt to provide answers to at least some aspects of this matter up until the end of the 18th century, I propose first to consider the case of gardens and then that of Chinese ornamental plants. Where gardens themselves are concerned, any influence there came indirectly from the impact of texts and images; where plants themselves are concerned, it was not until they were actually introduced and were available from merchants or private individuals that their local impact could be appreciated. Let us begin by investigating first how Chinese gardens came to be known in Europe and then to what extent that knowledge, which revealed considerable differences from European gardens, came to influence the concept and realisation of gardens in Europe. After that, I shall try, using examples provided by France, to discover how Chinese plants arrived and the place they occupied in European gardens right down to the late 18th century.

⁵¹³ In the absence of the original edition, a later facsimile edition of the text on its own, published in 1986, is easily available.

(i) *Paper gardens: the basic texts*

In the writings of the Jesuit missionaries that we considered above, it is noticeable that details relating to ornamental plants appear only quite late on, whereas fruits caught the attention of authors very early, as did, to a lesser extent, plants grown in vegetable gardens. However, plants were certainly mentioned in all those works. But there are a few texts that concentrate on gardens. One of the earliest of them is to be found in *Les nouveaux mémoires sur l'état présent de la Chine* (1696), by Louis Lecomte, where we are told,

The Chinese pay little attention to the design of their gardens and to making them truly ornamental, but they do derive pleasure from them and even spend money on them. They build grottoes in them, create little artificial hills, and they bring whole rocks, one at a time, to adorn them, piling one upon another with the sole aim of imitating nature. If, as well as this, they can find enough water to give to their cabbages and vegetables, they reckon that they have all that they want. The emperor has fountains of water invented by the Europeans, but private individuals are content with their ponds and their wells.⁵¹⁴

The beginning of the above text is very revealing regarding a 17th-century French gentleman's view of the arrangement of Chinese gardens. For him, a pattern based on symmetry either side of a main axis, regular flowerbeds and ornamentation in the shape of sculptures, fountains and regular water features represented an ideal ornamental garden. Nevertheless, Father Lecomte here gives a very minimal description to convey the characteristic aspects of a Chinese garden, such as the importance of mineral objects, the presence of water and the impression of an imitation of nature. Given the success enjoyed by this book, this brief passage must have been known to a large number of people. However, the Europeans' interest in Chinese gardens really only took off with the publication of a letter written in Peking on 1 November 1743, which another missionary, Brother Attiret, sent to a certain Monsieur d'Assaut. Jean Denis Attiret, who arrived at Court in 1739 as a painter, was commissioned to decorate the new buildings that the emperor Qian Long was having constructed. In this capacity, he had plenty of time to observe the gardens inside the Yuan Ming Yuan. His letter, published in 1749 in Paris, in *Les lettres édifiantes et curieuses*, was rapidly translated into English and was published in London in 1752.⁵¹⁵ He told his correspondent that it was impossible to describe the emperor's palace, 'which is at least the size of Dijon', 'because nowhere have I ever seen anything like it . . . for in all that, there is nothing that relates at all to our way of building and our architecture'.⁵¹⁶ However, he says, he will try to describe the 'pleasure houses' or 'garden villas' belonging to important persons, many of whom are related to the sovereign. He writes as follows:

They are charming. They consist of a vast terrain in which little mountains have been created, ranging from twenty to fifty or sixty feet high, thereby forming an infinite number

⁵¹⁴ See Lecomte (1990, p. 210). ⁵¹⁵ See Beaumont (1752).

⁵¹⁶ Le Gobien et al. (1717–74, Volume 27, pp. 1–43).

of little valleys. Streams of clear water run through these little valleys and join together here and there to form pools and seas . . . In each of these valleys, at the water's edge, there stands a perfect assortment of several buildings composed of housing, courtyards, balconies both open and enclosed, gardens, flowerbeds, waterfalls, etc. forming an admirable scene. One leaves a valley not by fine straight paths, as in Europe, but by zig-zags, and curves that are themselves adorned with little pavilions and little grottoes, emerging from which one finds oneself in another valley quite different from the first one, either because of the shape of the terrain or because of the structure of its buildings.

All the mountains and hills are covered by trees, mostly flowering trees, which are very common here. It is a true earthly paradise. The streams are not edged by stone slabs hauled there using ropes, but are completely rustic with pieces of rock some of which lean forward, others backward and which are arranged with such skill that it looks like the work of nature. [Fig. 223] . . .

I said above that the streams meet and pour into ponds or seas. Indeed, one of those ponds is almost half a league in diameter in every direction and is called a sea. It is one of the most beautiful spots in this pleasure abode . . .

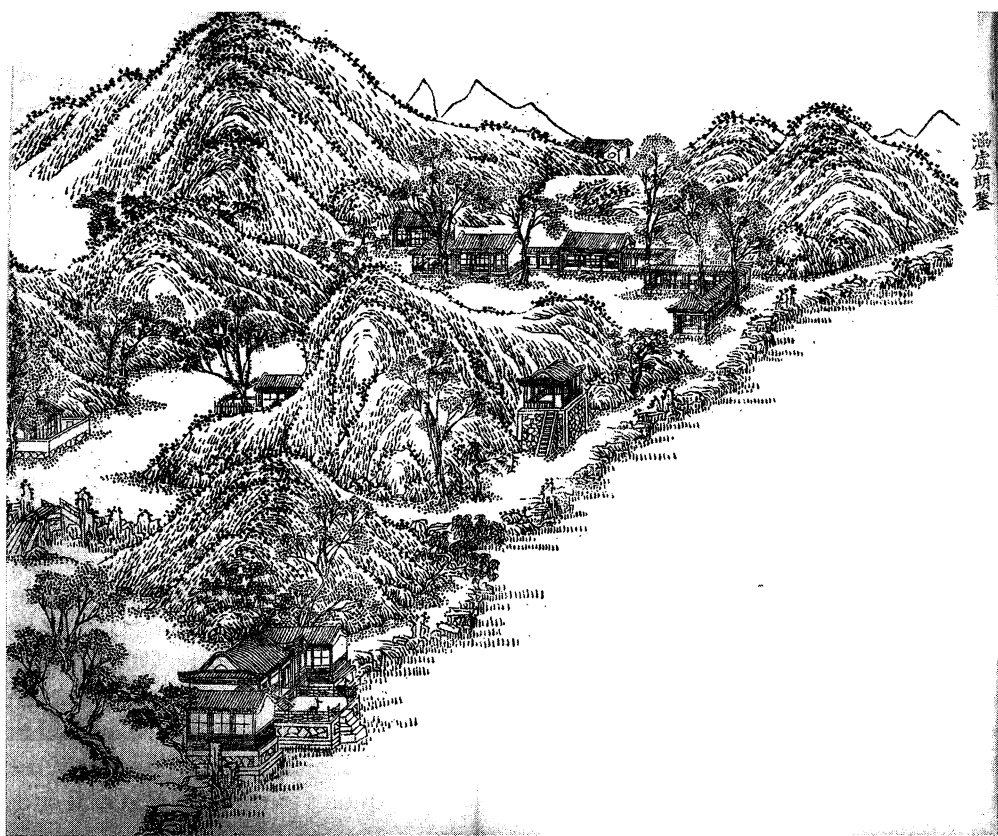


Fig. 223. Drawing of the Yuan Ming Yuan 圓明園, *Han xu lang jian* 涵虛朗鑒, from anon. (1887, *juan xia*). This view, one of forty landscapes of the 'Garden of Perfect Brightness', includes a particularly rocky bank as described by Brother Attiret in his letter.

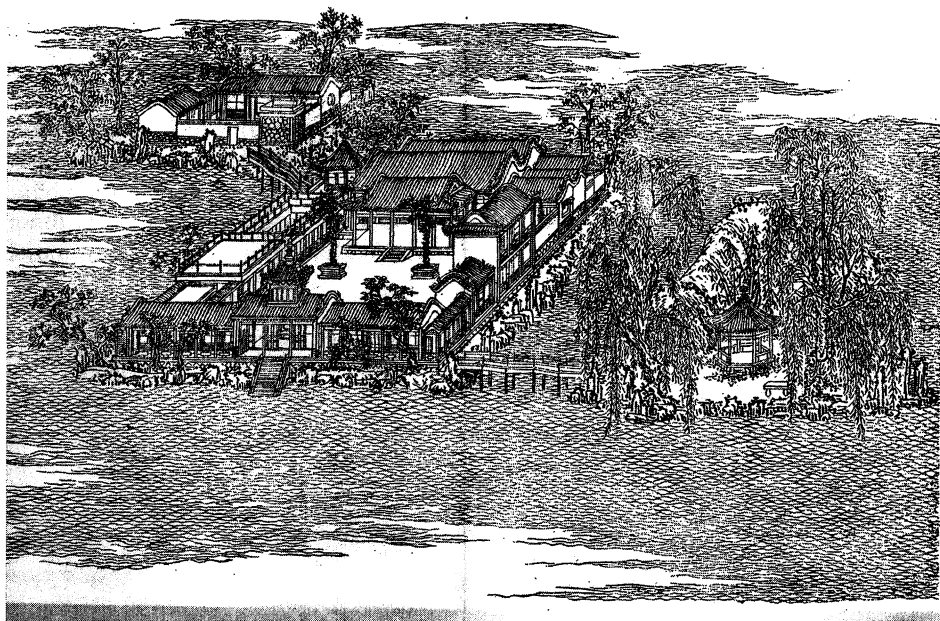


Fig. 224. Drawing of the Yuan Ming Yuan 圓明園, Jade Terrace on Paradise Island (*Peng dao yao tai* 蓬島瑤臺), from anon. (1887, *juan xia*). Brother Attiret was particularly struck by the beauty of this scene at the centre of the 'Garden of Perfect Brightness'.

But what really is a jewel is an island where a rock with a rugged, wild aspect rises out of the middle of this sea to a height of about two yards or so above the water level. On this rock a little palace has been built which, however, contains over one hundred rooms and halls. It has four facades and is of a beauty and tastefulness that defies description. The view from it is admirable ... [Fig. 224].⁵¹⁷

This text is accompanied by no illustrations, which increases its effect upon its readers, who are thus left to let their own imaginations wander freely. One is struck by the emphasis laid on 'the flowering trees, which are very common here', when one remembers that there were virtually no such things in European gardens at that time. Voltaire confirms the effect that reading this letter must have produced; in the article on 'Beauty' in his *Dictionnaire philosophique*, he quotes part of this text and ends it as follows:

⁵¹⁷ For images of its present state, see Allain, Chiu and Christiany (2002, pl. 77).

When Brother Attiret returned from China to Versailles, he found it small and gloomy. Some Germans, who were in ecstasies over the palace woods, were amazed that Brother Attiret was being so difficult. That is yet another reason that deters me from writing a treatise on 'beauty'.⁵¹⁸

Brother Attiret's enthusiasm at the sight of the various 'garden villas' within the Yuan Ming Yuan certainly aroused a considerable interest in Chinese gardens; however, it was another text that really unleashed a phenomenon that would progressively spread throughout a number of European countries. This was *The Design of Chinese Buildings, Furniture, Dresses, Machines and Utensils* . . . (1757) by William Chambers (1723–96).⁵¹⁹ Chambers came from a family of British merchants who had settled in Sweden, and he was born in Göteborg. After studying in England, in 1739 he returned to Sweden and entered the Swedish East India Company. Between 1740 and 1748, he travelled in Bengal and China. In 1749 and 1750 he was studying in the school of architecture run by Jacques-François Blondel, in Paris, after which he moved to Italy to continue his education. It was after his return to London that he published his *Designs of Chinese Buildings*, which was immediately translated into French and was published in that same year in London. In 1763 he published *Plans, Elevations, Section and Perspective views of the Gardens and Buildings at Kew in Surrey*, a work containing illustrations of the Chinese constructions in the garden of the Princess of Wales, in Kew. In 1771, François de Paule de Latapie, the French translator of Thomas Whately's *Observations on modern gardening, illustrated by descriptions* (Payne, London, 1770), under the title *L'art de former les jardins modernes ou l'art des jardins anglais* (The Art of Forming Modern Gardens or the Art of English Gardens), added to his translation of the English text a 'Preliminary address' in which he briefly summed up the contents of Father du Halde's *Description* of the residencies of mandarins,⁵²⁰ and then cited the text of Chambers's *The Art of distributing gardens in the Chinese manner*, a chapter of his *Design of Chinese Buildings, Furniture, Dresses, Machines and Utensils* (1757), which he followed with part of Brother Attiret's letter about Chinese gardens. This shows that for enthusiasts of the new gardens in France, there was a close connection linking the Chinese and the English styles. This was further confirmed by the speed with which a new text by Chambers, published in 1772, *A Dissertation on Oriental Gardening*, was immediately translated into French and published in London. In this *Dissertation*, Chambers again set out his ideas of a garden, contrasting them with an opposite tendency in England, championed by Walpole. Meanwhile, in the following year a second edition appeared, to which an 'explanatory' text was added: *An explanatory discourse by Tan Chet-quā*. This too was immediately translated into French, with the title *Discours servant d'explication par Tan*

⁵¹⁸ See Voltaire (1838, p. 211).

⁵¹⁹ I am basing my remarks here on the work by Barrier, Mosser and Chiu (2004).

⁵²⁰ 'The Chinese, Father Duhalde tells us (Volume 2, p. 86), adorn their gardens with woods, lakes, anything that recreates a view. Some make rocks & artificial mountains, pierced in many places, with many labyrinthine detours, for enjoying the cool air. Some raise deer and fallow deer, when they have enough space to create a park. They also have fish-ponds for the fish and riverside birds'. Whately (1771, *Discours préliminaire*, pp. viii–ix).

*Chet-qua de Quang-Cheou-Fou, gentilhomme ... dans lequel les principes établis dans la dissertation précédente se trouvent éclaircis et appliqués à la pratique.*⁵²¹ Soon after this, Claude-Henri Watelet (1718–86), in his famous *Essai sur les jardins* (1774),⁵²² devoted twelve pages to ‘a Chinese sage’s description of a garden that he has enjoyed arranging in order to savour the charms of Nature, the delights of study and mixing with a carefully selected society of friends’.⁵²³ This was a readaptation of a short text written by Sima Guang, entitled *Du le yuan ji* 獨樂園記⁵²⁴ (Note on the Du Le Yuan), the ‘garden of solitude in which to enjoy one’s leisure time’, in which the author describes not only the garden but also the pleasure that it gives him.⁵²⁵ Watelet observes, ‘This description contains a foreign character and aspect that may arouse a reader’s curiosity’; he then immediately describes his reactions to ‘a French garden’. Those two texts must have impressed his readers for, as Patrick Conner comments, ‘The combination of Watelet’s elegant reasoning with Chambers’s flight of fancy lent a distinctive oriental flavour to many of the French landscape gardens which followed their lead’.⁵²⁶ A publication by Le Rouge clearly confirms the accuracy of that remark. In 1776, Georges Louis Le Rouge (c.1707–c.1790),⁵²⁷ ‘Engineer and geographer to the King’, started to publish notebooks of pages devoted to the ‘Anglo-Chinese gardens now fashionable or details relating to the new gardens that are in fashion’ (*Jardins anglo-chinois à la mode ou détails des nouveaux jardins à la mode*). In Notebook v, he cites the French version of Chambers’s *Designs of Chinese Buildings* ..., introducing a few minor modifications.⁵²⁸ As the principal title of the collection suggests, many plans of so-called ‘Anglo-Chinese’ gardens are included in the various notebooks, but sometimes one comes across plans for ‘Chinese gardens’ either planned for Europe or already in existence there (Fig. 225). Notebooks xiv to xvii, however, are exclusively devoted to pictures of Chinese gardens in China, which are engraved from original Chinese illustrations (Fig. 226). Notebook xiv is composed of ten plans for ‘pleasure houses’ for the Emperor – that is to say, the groups of buildings in the garden villas that are to be found in the Yuan Ming Yuan.⁵²⁹ The next notebook is devoted to the ‘Gardens of the Emperor of China’. The commentary that accompanies the first plate runs as follows:

His Ex.[cellency] M. le Comte de Cheffer, Senator, and Ch.[evali]er of the order of Cherubins and Seraphins, in Stockholm, has entrusted these gardens from Peking to

⁵²¹ The French translations of the three texts by Chambers are reproduced in Barrier, Mosser and Chiu (2004, pp. 135–235).

⁵²² I cite this date which appears in all the works in which the book is cited, but the title page of the original edition gives the date as 1764.

⁵²³ See Watelet (1774, p. 123).

⁵²⁴ *Sì bu cong kan ji bu*, Wen Guo Wen Zheng Sima Gong Wen Ji, *juan* 66, 9a–10b. For a modern edition of this text, see Chen Zhi (1983, pp. 24–8).

⁵²⁵ A partial translation of this text appears at pp. 461–4 and in Métaillé (1998c, pp. 249–50).

⁵²⁶ Conner (1979, p. 86). ⁵²⁷ For a biography of Le Rouge, see Korzus (2004).

⁵²⁸ See Royet (2004, p. 124).

⁵²⁹ For a glimpse of the present state of these places, see Allain, Chiu and Christiany (2002, in particular Plates 4 to 91).

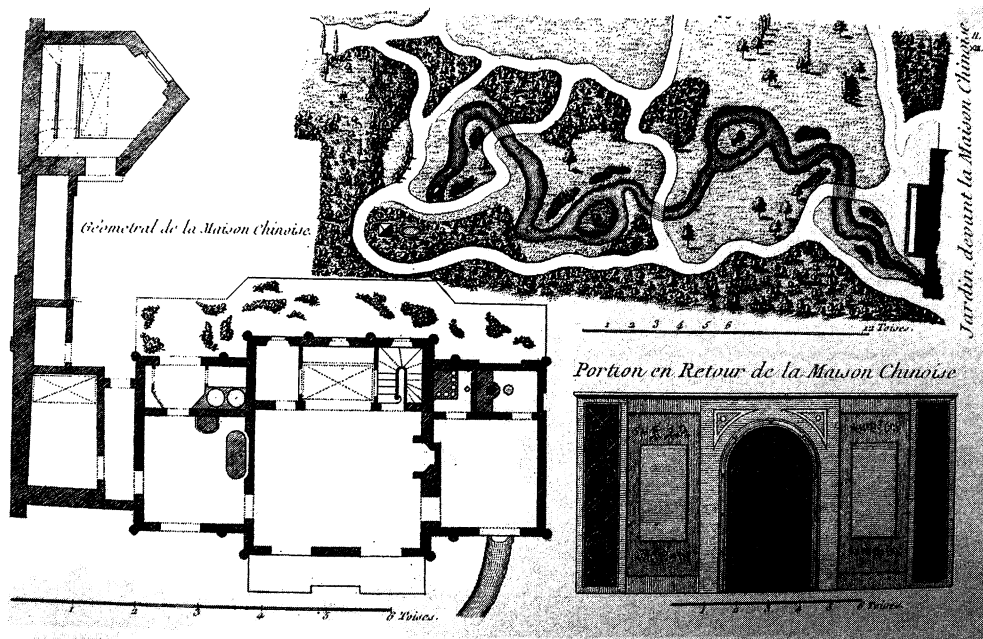


Fig. 225. Plan of a 'Chinese house' and its garden, from *xiii^e cahier des jardins anglo-chinois* (Le Rouge 1785), which contains the details of 'Désert de Retz'.

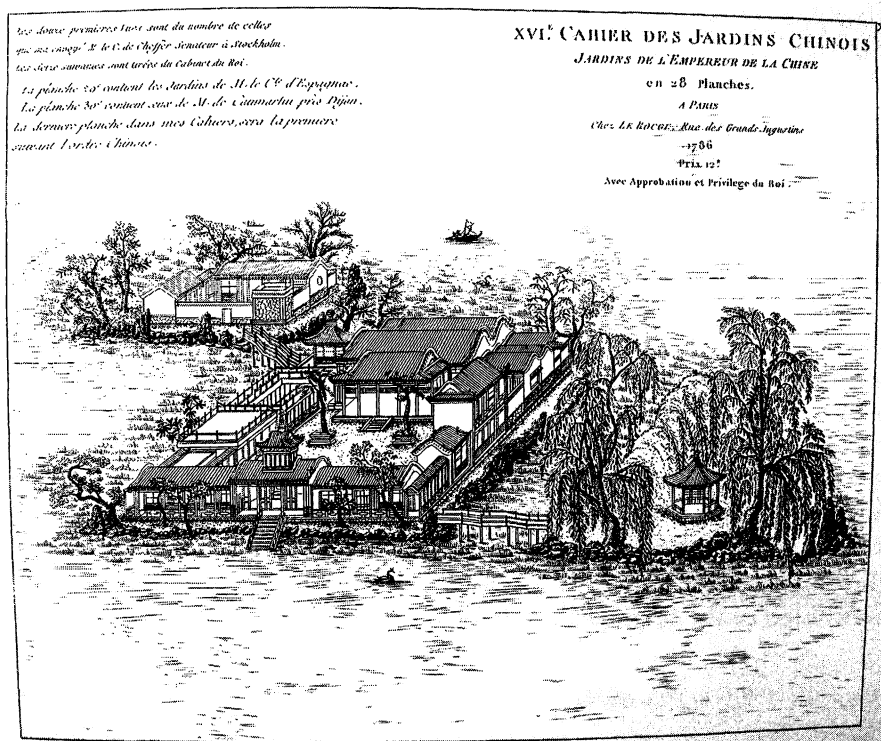


Fig. 226. Title page of Le Rouge's *xvii^e cahier des jardins chinois, jardins de l'empereur de la Chine* (1786).



Fig. 227. First page of *xvii^e cahier des jardins anglo-chinois*, containing thirty plates, which depict the last of the ninety-seven summer houses of the emperor of China.

M. le M.[arqu]is de Biencourt while he was in Sweden and has given him permission to engrave them in Paris in order to promote the art of Gardens, since, as everyone knows, English gardens are simply imitations of those of China. In all, there will be 97 of them.

That last-but-one declaration seems to provide a categorical answer to the question of the nature of 'Anglo-Chinese' gardens. Notebook xv contains pictures of twenty-seven other 'scenes' in the Yuan Ming Yuan, and these are followed by eleven more in the next notebook. Notebook xvi also contains engravings of fifteen landscapes in various regions of China, completed by twenty-five others that make up Notebook xvii (Fig. 227). These engravings definitely constituted the largest collection of representations of real Chinese sites up until that time. They make it possible to form a more precise and correct idea of the places described by Brother Attiret. They no doubt also made it easier to appreciate Chambers's theories. Other texts, likewise produced by Jesuits, were soon to provide more details about these gardens. The first appeared in Volume 2 of *Mémoires concernant les Chinois*, published in 1777.⁵³⁰ This consisted of the original French adaptation of the text by Sima Guang on the

⁵³⁰ See *MCHSAMUC*, 2, 1777, pp. 643–50.

subject of his *Du Le Yuan*, entitled 'The garden of Sée-ma-kouang, Poem'. In all probability, Watelet had known of the manuscript of this adaptation and had, in his turn, 'readapted' it, slightly altering certain terms in order to disguise his borrowing of it and, to complete the matter, had arranged for its first publication. However, his attempt to 'camouflage' his actions was not very successful. To cite but one example: as a translation of 迂叟... 買二十畝... 為園 *yu sou*⁵³¹... *mai er shi mu*... *wei yuan*⁵³² ('I have purchased twenty *mu*... to make a garden'), the text of the *Mémoires* reads, 'Twenty acres of land sufficed for my plan', and Watelet proposed 'a small number of acres sufficed for my plan'. The brief introduction, probably written by Martial Cibot, that precedes the 'translation' in the *Mémoires* is worth citing here in its entirety, for it proposes a synthetic approach to the perception of Chinese gardens, which to some extent summarises the admirable detailed descriptions in Brother Attiret's letter. The text runs as follows:

There has fallen into my hands a translation of the famous Sée-ma-kouang, on his Garden. But, before reading it, it is a good idea to have some idea of Chinese Gardens. First, it is necessary to understand that one seeks simply to copy beautiful nature there and to gather together in a quite limited space all that nature has sown here and there in the scenes and views of countless landscapes. One should also understand that people only go to these Gardens in order to escape the tumult of the world, to breathe freely and enjoy peace in one's soul and thoughts in the silence of solitude that one tries to render so naive and natural that it creates an illusion for one's senses. Finally one should take as one's starting point the principle that in a Garden one enjoys only gardening and that even the least delicate eye as much as the most fastidious one would be affronted by the ostentation of marbles and statues, etc. The Gardens of China are studied but natural imitations of the various beauties of the countryside, the hills, valleys, gorges, ponds, little plains, stretches of water, streams, islands, rocks, grottoes, ancient caves, plants and flowers. The great achievement of art consists in extending a small space by means of the multitude, variety and surprises of all its aspects, borrowing all the resources of nature, and honouring it. This Note is taken from *A Description of the Yuen-ming-Yuen Garden, sent from Peking, some years ago, together with illustrations. The author of the Description adds: to imagine more or less the effect of all these parts (that are shown in the drawings), one must assume that the hills are dispersed, raised up, lowered, linked, separated, distributed, covered in bushes, flowering trees, huge trees, spread with lawns and bristling with rocks in such a way that the decoration of the landscapes is extremely varied. One must also bear in mind that the land in between the hills and the water is adorned by flowerbeds, orchards, carpets of greenery and patches that are not cultivated but left to the wild grasses. One must also remember that the banks of the waterways that are not steep and rocky are, instead, sandy or pebbly or else grassy or covered in reeds; in some places they are steep, in others built up and the water, sometimes shallow, elsewhere deep, has cascades, abrupt waterfalls, gentle murmurs and stretches that are as still as glass. Finally one must also imagine palaces, buildings, galleries and so on, some of which possess a fabled magnificence, while others are just clean and extremely unpretentious, several of them simply constructed from straw, reeds or bamboos, as they are in villages. All these imagined vistas, which are based on the*

⁵³¹ 'Old slowcoach', the pseudonym of Sima Guang. ⁵³² See Chen Zhi (1983, p. 25).

truth, combine to create a prodigious variety of scenes in the Garden, & even somehow double its size, because a particular place looks different depending on the position from which one sees it, etc. *Such is the general idea of the modern gardens of the Chinese. However, the poem by Sée-ma-Kouang proves that this type of garden is nothing new in this Nation, for Sée-ma-kouang was prime minister in the year AD 1086.*

A text such as this seems to me to present the reader with all the material and conceptual elements which, according to the author, are necessary for the creation of a garden 'of the Chinese type'. However, as in all the preceding texts, one's view remains external: the Chinese garden presents a representation of nature on a miniature scale. The idea of evoking particular landscapes or even famous pictures, to which Chinese texts written by the proprietors of such gardens constantly refer, is not even mentioned. In 1782, Volume 8 of the *Mémoires* contained an 'Essay on the Pleasure Gardens of the Chinese' in which the author announced that he would 'try to sketch in the history of the pleasure gardens of far-eastern Asia & to colour in a view of the plan & ornaments of those of today'.⁵³³ He emphasises

the simple ornaments, of a kind that suit a garden the plan of which is based on the plans of nature, & all parts of which are nothing but an imitation of those that create the charm of the countryside.

All that is rigidly lined up and symmetrical is a far cry from nature. Nature does not offer trees planted in rows, flowers collected together in flowerbeds, water enclosed in containers or regular canals. These are the notions upon which the decoration of Chinese gardens is based.

Volume 9 of the *Mémoires* (1786) contains one further text that, once again, describes the sage in his garden, entitled 'The garden of the sage Sée-ma-kouang'. The subtitle announces 'Imitated from the Chinese'. What we have here is a new version of the French text, this time in Alexandrines. In 1777, the readers of the late 18th century were thus presented with a choice of either an approximate translation of the Chinese text or a plagiarism of that translation, and then, in 1782, an 'imitation' in verse. Yet not one of those texts presented a faithful rendering of the Chinese original. It is hard to resist the pleasure of presenting what the imagination of those authors contributed with the aim of emphasising the countrified aspect of this spot. A single passage sets the tone. Sima Guang writes,

When I am weary, I take my stick and go fishing, I collect simples, water the flowers, peel bamboos with my axe and then, to recover from those exertions, I settle down on a promontory, with a view of the horizon, as carefree as a goat, doing just what I like.⁵³⁴

The author cited by Martial Cibot interprets those few lines as follows:

When I am tired of composing and writing, amid my books in my great study, I throw myself into a boat that I myself propel and go to seek the pleasures of my Garden.

⁵³³ See *MCHSAMUC*, 7, 1782, pp. 301–24.

⁵³⁴ See Chen Zhi (1983, p. 26). English version of author's French translation.

Sometimes I land on the fishing island &, equipped with a large straw hat to protect me from the heat of the sun, I amuse myself catching the fish playing in the water, contemplating our own passions in all their mistakes. At other times, with my quiver slung over my shoulder and my bow in my hand, I climb to the top of the rocks and from there, spying on the rabbits that come out, I pierce them with my arrows as they emerge from their holes. Alas, wiser than ourselves, they fear danger and flee. If they saw me arriving, not one would appear. When I walk through my flowerbeds, I gather the medicinal plants that I wish to keep. If a flower pleases me, I pick it & smell it; if another is thirsty, I water it and its neighbours make the most of that. How many times have ripe fruit restored to me the appetite that the sight of dishes of food had taken from me! My pomegranates and peaches are not improved by being picked by my own hand, but I find that they taste better; & the friends to whom I send them are always delighted by them. If I see a young bamboo that I wish to go on growing, I trim it or I bend its branches and weave them together so as to clear the path. The water's edge, the depths of the wood and the tip of a rock all offer equally good seats for me . . .

Starting from the same text or the preceding, one some unidentified author wrote the following lines, which were published in 1786:

In my study, at the heart of my garden,
 When I've pondered too long over the books that I love,
 My lake offers me a skiff that I guide for myself,
 Enjoying, as I row, the delights of the morning.
 If the sun comes out, I seek a shady place.
 Beneath a straw hat, where my head is shaded,
 Seated on the grass or sheltered in a wood,
 I enjoy my leisure, fishing with a net
 And watching the games of the water's inhabitants.
 Armed with my quiver, in vain I often track
 Some fugitive prey for which I have high hopes;
 Or, if I am lucky, I bring down a stag or buck.
 Alas, these animals are wiser than men
 And, aware of the danger, know how to avoid it;
 While we, slaves of our passions as we are,
 Succumb to their false joys that shine before us.

We cannot fail to notice a tendency to alter the images by adding elements intended to render them more exotic. It is a tendency that we have recognised earlier in Kircher's handling of the images presented in Michael Boym's book, but here it is present in the treatment of written works: a brief Chinese statement gives rise to unexpected developments, in particular to a Romanticism quite absent from the Chinese texts, such as the image of Sima Guang, bow in hand, stalking rabbits or even deer.⁵³⁵

In all the texts mentioned above, it is striking that very few ornamental plants are mentioned. The contents of Notebook VII of Le Rouge's publication, which include

⁵³⁵ Although there were several species of hare, rabbits, which are of Mediterranean origin, were not introduced into China until the 19th century. See Shou Zhenhuang (1962, pp. 92–109).

a 'Picture of the general layout of all the Trees, Bushes and smaller bushes that exist in France and tolerate our winters ...', seems to corroborate this observation. Among the 413 cited species and varieties, we note a considerable presence of plants of American origin but very few plants from East Asia. I myself have discovered only 'Robinia sinica, the False Acacia of China',⁵³⁶ 'Vitex sinensis, the Agnus Castus of China',⁵³⁷ and 'Ginkgo biloba, the Gingo of Japan'. Does this mean that, at the end of the 18th century, these were the only Chinese species present in European gardens?

(ii) Chinese plants in Europe

During the 18th century there were two sources from which Chinese plants could be obtained: on the one hand, merchants who engaged in trade with the representatives of business partners in Canton, and on the other, missionaries who, because it was well nigh impossible for foreigners to travel within China, constituted the other possible source from which to obtain seeds and bulbs, especially since, in certain periods, they were able to live in various Chinese provinces. However, most missionaries were not prepared to take on such a task and, besides, had very few opportunities to go out and find plants on their own. Even if plant material – seeds in particular – could be obtained, it was essential that they arrived at their destination in a good state of preservation and that the seeds, once sown, would be able to germinate so that plants would eventually develop. Bernard de Jussieu's seed notebooks testify to the attention paid to such attempts in the royal Jardin des plantes in Paris. Among the missionaries, the main supplier of seeds was Father d'Incarville who, between 1672 and 1757, sent many batches of them to his correspondents not only in France but also in London and Saint Petersburg. In France,

There were four major individuals seeking seeds and information on plants: the erudite Fréret⁵³⁸ (1688–1749) between 1730 and 1736, the botanist Bernard de Jussieu from 1740 to 1757, the Minister Bertin⁵³⁹ (1720–1792) between about 1766 and 1780 and, finally, the director and general organiser of the Royal Buildings, Gardens, Arts and Factories of France, the Count of Angiviller⁵⁴⁰ (1730–1809), between 1784 and 1786–87, who was

⁵³⁶ The binome is today synonymous with *Caragana sinica* (Buc'hoz) Rehder, according to the GRIN (Germplasm Resources Information Network, United States Ministry of Agriculture). English: Chinese peashrub. However, it is possible that this may, rather, be *Sophora japonica*, which was successfully introduced by seed in 1746–7 in the King's Garden in Paris, using seeds sent by Father d'Incarville. In a letter to Father Du Halde, dated 8 October 1736, Father Dentrecolles identifies *hoai-chu* (*huai-shu* 槐樹, *Sophora japonica*) as acacia. See Dumoulin-Genest (1994, p. 150).

⁵³⁷ There are around twenty species of *Vitex* in China; the one designated *Vitex sinensis* may be *Vitex negundo* L. or else *Vitex negundo* L. var. *cannabifolia* (Sieb. et Zucc.) Hand.-Mazz.

⁵³⁸ Member of the Académie des inscriptions et belles-lettres in 1714, made permanent secretary in 1743.

⁵³⁹ Henri-Léonard-Jean-Baptiste Bertin, general controller of finance from 1756 to 1763, minister and state secretary in 1763, retired in 1780, honorary member of the Académie des sciences in 1761 then vice-president and president, honorary member of the Académie des inscriptions et belles-lettres in 1772.

⁵⁴⁰ Charles Claude de Flahaut de la Billarderie, comte d'Angiviller, was lifelong director of the King's Garden and a member of the Royal Society of Agriculture.

assisted by Thouin.⁵⁴¹ Three other figures were also keen to receive seeds from China, not for the King's garden, but in order to conduct experiments in their own gardens: the agronomist Duhamel de Monceau⁵⁴² (1700–1782); Louis xv's doctor, Louis-Guillaume Lemonnier⁵⁴³ (1717–1799); and the bookseller and publisher Louis François Delatour (1727–1807).⁵⁴⁴

Where seeds collected from merchants in Canton were concerned, their delivery to France depended on the interest and goodwill of the captains of the vessels of various companies established in the East Indies. Ideally, on the spot there would be someone with some idea of botany and horticulture who could receive and preserve them in the best of conditions and then make the necessary preparations for despatching them on the long sea voyage. Abbé René Galloys (1713–72) had in 1763 obtained the title of 'Naturalist to the King and the Royal Garden'. In 1764, he had set off for China, in the capacity of a ship's almoner, and had returned the next year, bringing with him

several living plants including two small unknown shrubs. The first, he named real TEA and delivered it to the Trianon garden . . . The second, which had alternate oval and stipulate leaves and looked like a *Grewia*, was presented to the Princess of Marsan⁵⁴⁵ and was placed in her little house in Montreuil, close to Versailles . . .⁵⁴⁶

Subsequently, the Abbé received a sum of ten thousand pounds to procure various plants from India and China, particularly tea plants, to be brought to the Île de France. Before his departure, Pierre Poivre gave him particular instructions that made it clear that 'the sole purpose of his mission was to seek out specimens of all useful plants, all the seeds of trees that produced foodstuffs, fruits and vegetables that might be able to be cultivated in our isles of France and Bourbon'.⁵⁴⁷ It was thought that the best chances of success in the introduction of Asiatic plants would be realised if these plants were able to acclimatise gradually; hence the idea of organising an intermediary stopover for them. On 3 October 1766, Pierre Poivre was appointed 'General organising Commissioner for the islands of France and Bourbon' and his functions were the following:

⁵⁴¹ André Thouin (1747–1824) was the eldest son of Jean-André Thouin, chief gardener of the King's Garden from 1745 to 1764. He succeeded his father, who had trained him, and retained this post until 1788. In 1792, appointed 'Commissaire [de la République] seeking out foreign trees and plants', he was made responsible for recording and recuperating plants introduced from abroad and cultivated in private gardens that might be of scientific interest to the Jardin des Plantes. He was 'Professor of cultivation' from 1800 to 1815. On Thouin, see Letouzey (1989); on Chinese plants, see Dumoulin-Genest (1993; 1994).

⁵⁴² Appointed inspector general of the Navy in 1739; member of the Académie des sciences.

⁵⁴³ He entered the Académie des sciences in 1743. Appointed demonstrator in the King's Garden in 1758, professor of botany from 1756 to 1789. On the life of Lemonnier, see Robida (1955, pp. 30–85).

⁵⁴⁴ Genest (1997, p. 30).

⁵⁴⁵ Certainly through the mediation of Madame de Marsan's great friend, Lemonnier, who was in charge of the Trianon garden. Later, he bought back from her the 'little Montreuil house' where he had created a garden. See Robida (1955, p. 41).

⁵⁴⁶ A. L. Jussieu, cited in Dumoulin-Genest (1994, p. 66, n. 4). Jussieu identified the shrub as *Grewia nitida* A. L. Juss.

⁵⁴⁷ Cited in Dumoulin-Genest (1994, p. 68).

The new director undertook to reconstruct the island and in particular to develop the kind of cultivation necessary for the subsistence of the inhabitants and also the squadrons of the king in times of warfare. He also expended all his efforts on introducing exotic products likely to make a profit in the markets of Asia . . .

It was in order to be able initially to receive the plants sent by Abbé Galloys from Canton, that Poivre bought back from the [East India] Company the estate of Monplaisir, situated in the Plain of Grapefruits.⁵⁴⁸

From there he brought back mainly tea and camphor plants.⁵⁴⁹ In this way, the Île de France (Mauritius) became linked with the royal Jardin des plantes in Paris, and from 1767 onward it provided the location of an important staging post in the cultivation of plants from China and other far-flung places.⁵⁵⁰ In 1787, for example, there could be found in the King's Garden, Monplaisir,

50 Chinese Apricot trees [1], 100 Chinese tallow-trees [2], 100 Loquat trees [3], Loquat, Abas or Lou-koet, a Chinese fruit tree, 3000 Chinese False Box or Marsania trees [4], 180 Chinese quince trees [5], 600 dwarf Chinese Latania trees [6], 1000 Litsai or Chinese false cherry trees [7], and 100 Wanpee or Chinese Red Nasebury trees [8] . . .⁵⁵¹

Even if the plants cultivated in the royal gardens in Paris in France, or in Kew in England, may not represent an exhaustive image of all the species introduced, we may reasonably suppose that they did represent most of them.⁵⁵² According to the enquiries made by Emil Bretschneider, at the end of the 18th century about seventy Chinese species were to be found in Paris,⁵⁵³ about thirty in Vienna,⁵⁵⁴ and about seventy in Kew.⁵⁵⁵ Some of those may of course have been identical, but we may estimate that those three gardens possessed about 100 cultivated botanical species of Chinese origin. Referring readers to Bretschneider's texts for the entire exhaustive list, I shall here cite only a few representatives of the species nowadays frequently to be seen in gardens or, in the case of trees, lining our avenues: *Dianthus chinensis* L., Chinese pink, cultivated in Paris since 1705 and in England before 1713;⁵⁵⁶ *Camellia japonica* L., attested in Paris in 1783 and cultivated in England before 1739; *Althea rosea* (L.) Cavan., garden hollyhock, introduced in Europe in 1753; *Firmiana simplex*

⁵⁴⁸ Dumoulin-Genest (1994, pp. 71–2). ⁵⁴⁹ Eve (2008, p. 40).

⁵⁵⁰ On the history of Poivre's garden, which later became the 'Jardin des pamplemousses', see Rouillard and Guého (1983). In a later period (1841–1939), on the role played by Kew Gardens in the knowledge and dissemination of plants in the British Empire, see Brockway (1977).

⁵⁵¹ Cited in Dumoulin-Genest (1994, p. 74). (1) probably *Prunus nume* or *P. armeniaca*; (2) probably *Sapium sebiferum* Roxb.; (3) probably *Eriobotrya japonica* Lindl./loquat; (4) probably *Murraya paniculata* (L.) Jacks./orange jasmine; (5) the context indicates that this may be a species of kaki, *Diospyros* sp., or else *Cydonia oblonga* Mill.; (6) despite its French name, with its reference to China, this palm tree, *Latania lontaroides* (Gaertn.) H. E. Moore/latan palm, originated on the Île Bourbon; (7) *Litsea* sp. (there are around sixty-four species of this genus in China (see How Foon-Chew 1982, p. 280); (8) *Clausenia lansium* (Lour.) Skeels = *C. wamphi* Blanco/wanpee.

⁵⁵² Kew House, a private property, rented from 1730 by the Prince of Wales, the son of George II, was acquired by the Crown in about 1789. See Bretschneider (1898b, p. 138).

⁵⁵³ Bretschneider (1898b, pp. 127–34). The date of the introduction is given in brackets.

⁵⁵⁴ Bretschneider (1898b, pp. 134–8). ⁵⁵⁵ Bretschneider (1898b, pp. 138–50).

⁵⁵⁶ 'It was among the flowers recommended by Fairchild for London gardens in 1722'; cf Coats (1956, p. 79). Thomas Fairchild (1677–1729) was 'deservedly famous for his pioneering work in deliberate hybridisation: Fairchild Mule Pink of 1717 was his cross between Carnation and Sweet William . . .'; cf Harvey (1974, p. 76).

(L.) W. F. Wight, Chinese parasol tree (= *Sterculia platanifolia* L.), described for the first time by Father Lecomte, cultivated in England in 1757; *Ailanthus altissima* (Mill.), swingle/tree of Heaven, introduced in France around 1751, then in England in 1757; *Koeleruteria paniculata* Laxm., goldenrain tree, introduced in England around 1763; *Gleditschia sinensis* Lam. (= *G. macrantha* Desf.), Chinese honeylocust, introduced in France around 1780; *Rosa laevigata* Mchx., Cherokee rose, cultivated in England in 1759; *Eriobotrya japonica* (Thunb.) Lindl., loquat, cultivated in England and in France around 1790; *Hydrangea macrophylla* (Thunb.) seringa, introduced in England in 1789; *Lagerstroemia indica* L., common crape myrtle, introduced in England in 1759, cultivated in Paris before 1789; *Rheum palmatum* L., rhubarb, cultivated in England in 1768 and in Paris at the end of the 18th century; *Daphne odora* Thunb., daphne, introduced in England in 1771 and in Paris before 1789; *Platycladus orientalis* (L.) Franco (= *Tuya orientalis* L.), Chinese arborvitae, cultivated in England in 1752; *Ginkgo biloba* L., ginkgo, first cultivated in England, before 1770; *Hosta plantaginea* (Lam.) Aschers, fragrant plantain, cultivated in Paris since the 1780s; *Sophora japonica* L., Chinese scholar tree, sown in Paris in 1747, introduced in Kew in 1753. In Kew Gardens, there were also *Paeonia suffruticosa* Andr., tree peony, introduced in 1787; *Magnolia denudata* Desr. (1789); *Magnolia obovata* Willd., Japanese bigleaf magnolia (1790); *Magnolia pumila* Andr., Chinese magnolia (1786); and *Cycas revoluta* Thunb. (c.1758).

This list conveys the real importance of these plants, which for the most part arrived in the second half of the 18th century and were cultivated in the royal gardens. To what extent had they begun to appear in private gardens? In the case of Kew, many of these plants came from the gardens of rich enthusiasts or, from 1780 onward, with the encouragement of Joseph Banks, directly from China. In Paris, they mostly arrived directly from China. To judge by the table published by Le Rouge in Notebook VII (1779), it would seem that Chinese plants were not yet easily obtainable. So what was it that made a 'Chinese' or 'Anglo-Chinese' garden? The various texts cited above provide the answer. It was a matter of imitating nature by artificial means but in such a way that the result looked 'natural'. It was important to avoid all symmetry. Certain elements seem to have been de rigueur, such as grottoes, the presence of water, or constructions such as little kiosks, pagodas, bridges and so on, but the presence of plants from China was seldom mentioned. The plans found in Le Rouge's notebooks convey a good idea of the general structure of such gardens, but a concrete example will convey a more precise idea of the importance of plants from China in one of the best-stocked gardens in France at the end of the 18th century. The garden, today known as the 'Balbi Park', which was adjacent to the King's Kitchen Garden in Versailles, was originally called the 'Pavilion and Garden of Monsieur', the king's brother and Count of Provence (1755–1824).⁵⁵⁷ From 1786 onward, he spent considerable sums on arranging this

⁵⁵⁷ He himself reigned from 1818 to 1824 under the name Louis xviii.

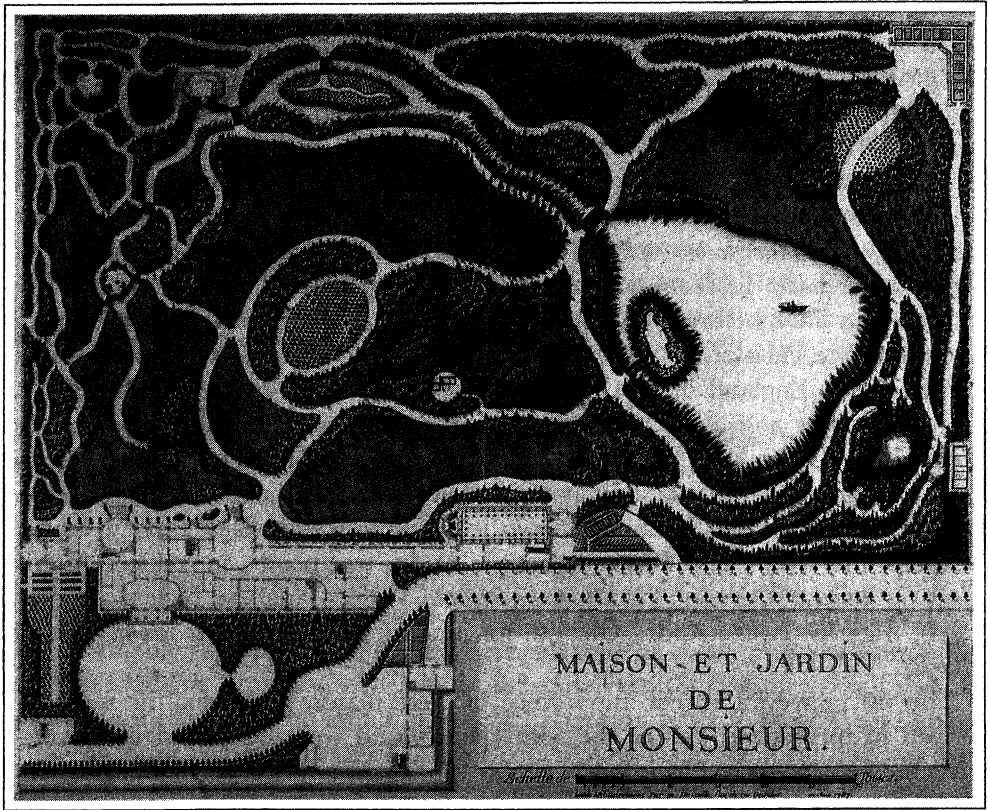


Fig. 228. Plan of the Balbi Park in Versailles, drawn by Ducaille in 1787.

garden, in particular on the purchase of plants.⁵⁵⁸ This was not a garden full of buildings, such as the Desert de Retz or the Folie de Chartres, now the Parc Monceau in Paris. Rather, it was ‘a garden of trees and plants’,⁵⁵⁹ as can be seen from the plan (Fig. 228). When, after the Revolution, in 1791, Monsieur went into exile, his property was placed on the civil list and on 5 November 1792 André Thouin,

chief gardener of the national Jardin des plantes in Paris, commissioned to seek out foreign trees and plants that are to be found in gardens on the civil list and in those of émigrés and that are lacking in the Jardin national of Paris or that could be useful to it,

paid a visit to Monsieur’s garden. His purpose was to choose plants in pots or in crates that seemed to him to be of interest. He proceeded to seize ‘94 different

⁵⁵⁸ At the time of the Restoration, his nurseryman and gardener, Jacques Louis Descemet, reported a debt of 49,650 francs. See Joyaux (2005, p. 29).

⁵⁵⁹ Hamon (1993, p. 43).

species, made up of 108 individual plants in eight crates . . . which were loaded on to three carriages'.⁵⁶⁰ Two months later, it was the turn of the 'foreign' trees that he had selected to be rooted up and transferred provisionally to Trianon, whence they were supposed to be taken to the Jardin national des plantes. In the end, however, the Directory ruled that they should be replanted at Trianon. On his first visit, Thouin had made a list of all the plants to be removed. That list, which is preserved in the central library of the Muséum national d'histoire naturelle, enabled me to pick out from the collection of plants that Thouin had reckoned to be of interest to science the plants that were native to China.⁵⁶¹ Out of the 212 species listed, five (four of which were each represented by a single individual plant) were of Chinese origin: *Camelia japonica*; *Ginkgo biloba*; *Sterculia platanifolia* (*Firmiana simplex*), the Chinese parasol; *Zizypus sylvestris* (*Zizypus jujuba*), the jujube tree; and two specimens of *Croton sebiferum* (*Sapium sebiferum*), the tallow tree; but there were also '22 crates of orange trees' concerning which no other details are provided. In contrast, the plants of North American species are far more plentiful. The difference between the two groups is certainly not fortuitous or because of any lack of interest in plants from China; among the titles of the 11,624 works in the extremely rich library of the Comte de Provence, Adeline Hamon found a *Description des plantes de l'Amerique* by Father Plumier (1713) and a volume belonging to the *Collection précieuse et enluminée des fleurs les plus belles et les plus curieuses qui se cultivent tant dans les jardins de la Chine que dans ceux de l'Europe*, written by Pierre-Joseph Buc'hoz (1776).⁵⁶² No doubt the hundred or so species of Chinese plants to be found in botanical gardens had not yet been sufficiently multiplied and acclimatised for them to be available from nursery gardeners. In fact, there is a document to confirm this. It is a supplement that Jean-Marie Morel attached to the second edition, published in 1802, of his *Théorie des jardins, ou l'art des jardins de la nature* and entitled 'A dendrological Table, containing the list of the ligneous, indigenous and exotic plants that have been acclimatised . . .'. Among the 163 species mentioned, I noticed five that are expressly designated by the author as being 'from China', one 'from China and Japan', one 'from Tartary', and one 'from Japan'. The Chinese species are named as follows: 'Jasminoid', *Jasminoides lycium Europaeum*, 'with blueish flowers';⁵⁶³ 'paper mulberry tree (*Broussonetia papyrifera* Vent.), classified as a variety of *Morus sativa* (the cultivated mulberry tree, *Morus alba* L., native to China, introduced in the 16th century); Sumac, *Rhus Vernix* (lacquer tree, *Rhus verniciflua* Stokes = *R. vernicifera* DC.), Thuya, *Tuya orientalis* (*Tuja orientalis* L.). The species 'from China and Japan' is *Ginkgo biloba*, that 'from

⁵⁶⁰ Cited in Hamon (1993, p. 72).

⁵⁶¹ The list, transcribed and brought to light by Yves Baudron, appears as an appendix in Hamon (1993, pp. 143 ff.).

⁵⁶² Hamon (1993, p. 26).

⁵⁶³ The French name refers to *Lycium barbarum* Ait. (see Burte 1992, p. 2034). However, this species has flowers that are 'pale, between pink and white'. The species to which Morel refers here may be *Lycium chinense* Mill. (*gou-qi* 枸杞), with a 'purple, bright violet' corolla; Bretschneider (1898b, p. 132), repeating Lamarck's remarks, writes that it 'has for a long time been cultivated in the King's Garden'.

Tartary' is an 'Apple tree, *Malus baccata*' (*Malus baccata* (L.) Borkh., Siberian crab-apple, cherry crab). The one described as 'from Japan but of Chinese origin' is the '*Sophora, Alopecurioides*' (*Sophora alopecurioides* L., *ku dou zi* 苦豆子).⁵⁶⁴ We can only conclude that at the end of the 18th century, in France, Chinese flora was very poorly represented in gardens even if these were called 'Chinese' or 'Anglo-Chinese'.

Perhaps the sole example of a garden 'in the Chinese taste ... without regard to the taste of Europe' is the one that Bertin wanted to create in 1786. He asked Father Bourgeois (1723–92), the Jesuit leader of a mission to Peking, to reveal to 'Chinese enthusiasts or architects' a description of the terrain and houses involved so that 'some Chinese architect can provide one or several drawings of flowerbeds and someone can send us a few details about the bushes and flowers etc. that they would use'.⁵⁶⁵ But he received no reply to his request.

Finally, in order to improve upon the information provided by Thouin's inventory of 'the Garden of Monsieur' in Versailles and extend it to cover the provinces of France, 'the National Convention's committees responsible for properties and public information' sent out a questionnaire to all districts. It was designed to discover the state of 'botanical gardens', with a view to preserving rare plants, and it is the source of the most complete information available. The meticulous research of Marie-Pierre Dumoulin-Genest reveals that twenty-three gardens possessed plants that were Chinese species.⁵⁶⁶ In the tree category, in all, the following nine species are mentioned: ailanthus (*chou chun* 臭椿), parasol (*wu tong* 梧桐), tallow tree (*wu jiu* 烏桕), varnish tree (*qi shu* 漆樹), ginkgo (*yin xing* 銀杏), honey locust tree (*zao jia* 皂莢), paper mulberry (*gou shu* 構樹), Japanese *Sophora* (*huai shu* 槐樹) and Chinese thuya (*ce bai* 側柏). There are eight species of shrub: Japanese camellia (*shan cha* 山茶), Chinese box (*jiu li xiang* 九里香), Chinese hibiscus (*zhu jin* 朱槿), cotton rose mallow (*Hibiscus mutabilis* L.) (*mu fu rong* 木芙蓉), the tea plant (*cha* 茶), Chinese rose bush (*yue ji hua* 月季花), Chinese wolfberry (*gou qi* 枸杞) and Chinese mallow (*Malva* sp.) (*kui* 葵), to which lemon and orange trees in crates should be added. As for herbaceous plants, there were chrysanthemums (*ju hua* 菊花), the Chinese pink (*shi zhu* 石竹), the queen-marguerite (*cui ju* 翠菊), the hollyhock (*shu kui* 蜀葵), the China root (*tu fu ling* 土茯苓), rhubarbs (*da huang*, 大黃, *zhang ye da huang* 掌葉大黃, *bo ye da huang* 波葉大黃). With but one exception, all gardens possessed no more than two species. The exception was the garden of George-Louis-Marie Dumont, Baron de Courcet (1746–1824), who, following a military career, devoted himself to applied botany and the improvement of cultivated plants. He was the author of *Le botaniste cultivateur* and, in his garden close to Boulogne, he possessed all the trees cited above as well as two tea plants and a Chinese rose.

⁵⁶⁴ This species does not appear in the flora of Japan by Makino Tomitaro (1970).

⁵⁶⁵ Dumoulin-Genest (1994, pp. 419). ⁵⁶⁶ Dumoulin-Genest (1994, pp. 427–9).

These documents show us that, at the end of the 18th century, despite the great interest in Chinese gardens, their influence came, as it were, filtered through European imaginary representations. It was, above all, the constructions that were considered to be typical that set the tone – pagodas, bridges, ‘Chinese houses’, grottoes and so on. As for Chinese plants, although they were very much desired, only a tiny number of them actually found their way into private gardens.

(k) CONCLUSION

It now seems to me to be necessary to revert to the points I made in my Preface and to specify both what my own approach shares with the grand project of Science and Civilisation in China and where it adopts different methodological principles from those of Joseph Needham. First, in order to remove all ambiguity, we should remember that when he and Lu Gwei-djen entrusted to me the task of continuing and completing the work on botany that they had begun in Volume 6, Part I, they allowed me complete freedom and imposed no constraints or directives. Together, we made a copy of all the notes that they had made in preparation for the last chapters that they had not had time to complete and they left me absolutely free to make use of those documents as I wished and, of course, to complete them. Even if a first version of the manuscript of sections f, 'Treatises on traditional botany and the development of classification', and g, 'The development of plant description and illustration', had reached him shortly before his death, I do not think that he had time to read it. On the other hand, he had reacted very positively to his reading of the part devoted to the *tong* trees that I had passed to him earlier.

In his address to the opening session of the 15th International Congress of the History of Science, in Edinburgh in 1977, Joseph Needham said,

I suppose we all generally agree that there is only one unitary science of nature, approached more or less closely and built up more or less successfully and continuously, even if very slowly, by the several groups of mankind, from age to age. This means that we could expect to trace an absolute continuity between the first beginnings of astronomy and medicine in ancient Babylonia or ancient Egypt, through the advancing natural knowledge of mediaeval China, India, Islam and the classical Western world, to the break-through of late Renaissance Europe when, as has been said, the most effective method of discovery was itself discovered . . .¹

Then he said,

Of course we must not see in the traditional sciences of China or India simply 'failed prototypes' of modern science; we must get inside the minds of those who cultivated them and understand how it was that they came to their conclusions. But we must never deny the fundamental continuity and universality of all science.²

As we can see from reading the second of those two passages, Joseph Needham himself was issuing a warning against a possible negative consequence of the teleological view of the history of sciences that he recommended, and to defend himself it seemed wise to set up as a dogma the concept of 'the fundamental continuity and universality of all science'. From a methodological point of view, such an approach involved a risk – that of distorting the facts in order to emphasise

¹ Needham (1978, p. 110).

² Needham (1978, p. 111).

the continuity that was presented as axiomatic. Even without intending any deliberate manipulation, given that the result was assumed to be known, there might be a tendency to privilege the facts that made it possible to arrive at the foreseen conclusion. I myself think it wiser to begin by considering the information provided by the Chinese texts, endeavouring to remain as much as possible within the historical context of their respective periods, without referring at all to modern science. Only later can one integrate that dimension from a comparative point of view but without suggesting anything a priori. Here is an example to illustrate my point. At the 12th International Congress of Sciences in Paris, in 1968, Joseph Needham presented a paper entitled 'The Development of Botanical Taxonomy in Chinese Culture'.³ He began with the following question: 'At what period did Chinese scholars interested in plants and animals begin to classify them in a dendritic or hierarchical manner? ... More especially, when did three levels of groups or classes and sub-classes appear?' He immediately continued as follows: 'Perhaps the best way to open this subject is to have a look at the terms used by modern Chinese botany and zoology for the various levels of classification'. Pointing out 'that nearly every one of these terms, defined in strict hierarchical order today, occurs in ancient texts going back to the middle of the -1st millennium', even if 'they were not ranked always in the same order or with the exact meanings which they have now', he declared that in principle 'there are certain examples in the *Er ya* where we can find a classification in three levels – very roughly corresponding to family, genus and species'.

Not one of those remarks is erroneous, but I prefer to reverse the perspective. We have noticed that, up until the 6th century, the Chinese sources reveal different ways of classifying plants, depending on the context.⁴ Toxicity, taste and therapeutic nature are fundamental in the domain of *materia medica*, whereas common distinctions – as between fruits, potherbs or staple foods, and in the ways of procuring them – by gathering or by cultivation – and, finally, the nature of the stem – woody, climbing or herbaceous – were only noted as secondary criteria by, for example, Li Shizhen. But those criteria, which are secondary when the plants are considered as *materia medica*, in agricultural treatises become of the first importance when plants are being presented. Finally, I have shown that it is the type of fruit that is the sole criterion that is clearly operative in classifications in which the morphological character appears to be the determining factor.⁵ Even if those classifications are hardly elaborated, that is a factor that needs to be emphasised: what I have in mind here is the examples given in the chapters of the *Er ya*, in the five categories of the *Zhou li* and in those of the *Wu xing da yi*.⁶ Thanks to an analysis of the information that these texts alone provide, behind the various ways of classifying plants according to the domains of reference of the texts in question I have demonstrated the permanent presence of a folk classification that had not been taken into account

³ Needham (1971). ⁴ Jiang Ying (1980a). ⁵ See above, pp. 34–5.

⁶ See respectively, pp. 48–55, pp. 34–5 and pp. 45–8 in this volume.

by any earlier works on the classifications of plants and animals in ancient China. That was precisely because their authors sought not so much to produce an internalist analysis but rather to reveal a great similarity between, on the one hand, the ancient Chinese classifications and, on the other, the systems elaborated from Linnaeus onward.⁷ Analysis of the *Ben cao gang mu*, in particular, has revealed the reality of covert categories the existence of which Joseph Needham had indicated, labelling them ‘submerged families’ and considering them to anticipate, in ancient Chinese classification, the natural families of contemporary botany.⁸ As I have shown, those elements make it possible, even within the scholarly classification elaborated by Li Shizhen, to reveal the presence of a folk taxonomy that is comparable to many other classificatory systems in other cultures,⁹ which anthropological works have been bringing to light ever since the 1970s.¹⁰ Taking his place within a tradition initiated some ten centuries earlier by Tao Hongjing, Li Shizhen carried the classification of natural sources of medicaments to a degree of complexity unsurpassed by any other author of a treatise on *materia medica*, *ben cao (shu)* 本草(書). He did so by reorganising the order of the major ‘sections’ (*bu* 部) that accommodated the whole of *materia medica*, in accordance with a clearly announced double logic: on the one hand that of the cosmological system of the Five Phases and, on the other, a scale of beings ranging ‘from the lowest to the most precious’.¹¹ However, he adopts a non-hierarchical, purely intuitive approach to the choice of the categories (*lei* 類)¹² that form the lower levels of his classification.¹³ In this respect the classification of natural objects in the *Ben cao gang mu* has very little in common with that of Linnaeus. Joseph Needham’s exhortation to ‘get inside the minds of those who cultivated [the ancient sciences] and understand how it was that they came to their conclusions’ has been and remains at the heart of my researches, and I do not in any way reject the ‘universality of all science’; however, I do have my doubts about any ‘fundamental continuity’. In order to justify this point of view regarding the possibility of different developments, in accordance with different perspectives in the domain of natural history, let us now explore the last work devoted to plants by a Chinese author, completed in 1847, eleven years before the publication of the *Zhi wu xue*, the first book in Chinese to present the modern science of botany.¹⁴

⁷ For examples, see Xia Weiying (1962), Gou Cuihua and Xu Kangsheng (1982, in particular pp. 170 and 171), and my own remarks at pp. 113–18 above.

⁸ Needham (1971, pp. 130–1). ⁹ See pp. 88–91 above. ¹⁰ See Berlin (1992), Friedberg (1990), Ellen (1993).

¹¹ See Métailié (2001a), *SCC* Volume 7, Part II, p. 78.

¹² Needham (1971, p. 131) explained this as follows: ‘Li Shih-chen’s various *lei* do not correspond to any of the natural families recognised today, partly because they are broader and partly because they follow a different line of thought’.

¹³ In this sense, his approach is altogether comparable to that of his French contemporary Jacques Dalechamp. See Métailié (1989) and pp. 92–9 above, which I was prompted to engage in as a result of reading Joseph Needham (1971, p. 131). Nevertheless, Chen Jiarui (1978, p. 106) found Li Shizhen’s classification ‘*grosso modo* similar’ to that of Caesalpino, ‘but his contents definitely richer’.

¹⁴ On this text, see Métailié (1981), Pan Jixing (1984), Luo Guihuan (1987). This work by the mathematician Li Shanlan is an adaptation in classical Chinese of oral translations of the English handbooks of John Lindley made by Alexander Williamson, who was a Presbyterian missionary. The purpose of this operation was not so much to popularise science as to reveal the beauty of God’s work.

(1) THE *ZHI WU MING SHI TU KAO*

The *Zhi wu ming shi tu kao* 植物名實圖考, published in 1848, quite quickly attracted the attention of specialists outside China, thanks to the quality of its illustrations. This was probably as a result of the actions of Emile Bretschneider, who cited it as early as 1870¹⁵ and himself sent several copies to European and American libraries.¹⁶ Although he wrote that 'the one half of the book consists of a description (for the most part very confused) of the plants now known to the Chinese', he then went on as follows: 'The other half includes nearly 1800 carefully executed drawings. Although here also many mistakes occur, this work is incomparably the best pictorial work of the Chinese of his class'.¹⁷

The author, Wu Qijun 吳其濬 (1789–1847), was a native of Gu Shi in Hunan.¹⁸ His public personal name, *zi*, was Yu Zhai, and his surname (*bie hao*) was Yu Lou Nong, meaning 'the peasant of Gu Shi'. In 1817, he became a compiler for the Han Lin Academy. He successively acquired high-level administrative functions in a large number of provinces: chief examiner in Guangdong and in Zhejiang, director of teaching in Jiangxi and in Hubei, military director and governor in Hunan, Hubei, Yunnan, Guizhou, Fujian and Shanxi. In 1846 he retired from public life because of ill health. In the course of his career he made the most of his free moments, collecting plants, drawing them and finding out their names and uses by questioning peasants and gardeners. At the same time, he compiled many ancient works and in 1847, the year of his death, completed the botanical work that he had started seven years earlier, the *Zhi wu ming shi tu kao* (Researches into the Names, Realities and Illustrations of Plants).¹⁹ Because of the author's death, this work was to be revised and published in 1848 in Taiyuan by Lu Yinggu 陸應穀,²⁰ a 'distinguished botanist' and a native of Mengze in Yunnan,²¹ who himself wrote a preface to it. The work is composed of two collections, the *Zhi wu ming shi tu kao* and a companion volume, the *Zhi wu ming shi tu kao chang bian* 植物名實圖考長編. The first collection is divided into thirty-eight *juan*. In these the plants are divided into the following categories (*lei*): grains, *gu lei* 穀類 (*juan* 1–2: fifty-two *zhong*); vegetables, *shu lei* 蔬類 (*juan* 3–6: 176 *zhong*); mountain grasses, *shan cao lei* 山草類 (*juan* 7–10: 201

¹⁵ Bretschneider (1871), p. 6.

¹⁶ Bretschneider (1880), p. 73, writes, 'It has much attracted the attention of European botanists and sinologues in China, and is now to be found, I think, in all the great libraries of Europe'; in a note, he adds: 'I have myself procured at different times in Peking several copies of it, which were sent to London, Paris, Berlin, the United States of America, etc.'.

¹⁷ Bretschneider (1871), p. 6.

¹⁸ I have used two bibliographical sources: on the one hand Bretschneider's text (1880, pp. 73–4), in which he notes, 'the details here presented are drawn from a memorandum compiled from official sources and communicated to one of my friends in Peking by an officer of the Tsung Li Ya Men' and, on the other hand, the article by Chen Chongming (1980).

¹⁹ The Commercial Press edition of 1919 carries a subtitle in English: 'Chinese Botanical Terms with Illustrations'.

²⁰ There were to be numerous further editions in China: in 1880, 1915, 1919, 1956, 1957, 1963, 1974, 1993 and 1996, plus one edition in Japan, in 1884, of which the 1915 Yunnan Chinese edition is a reproduction. See Swingle (1925–6).

²¹ Liou-Ho and Claudius Roux (1927–8).

zhong); grasses in humid places, *xi cao lei* 隰草類 (*juan* 11–15: 284 *zhong*); grasses on stones, *shi cao lei* 石草類 (*juan* 16–17: ninety-eight *zhong*); water grasses, *shui cao lei* 水草類 (end of *juan* 17 and *juan* 18: thirty-seven *zhong*); climbing grasses, *man cao lei* 蔓草類 (*juan* 19–23: 235 *zhong*); fragrant grasses, *fang cao lei* 芳草類 (beginning of *juan* 23 and *juan* 25: seventy-one *zhong*); poisonous grasses, *du cao lei* 毒草類 (end of *juan* 23 and *juan* 24: forty-four *zhong*); ornamental plants, *qun fang lei*²² 群芳類 (*juan* 26–30: 142 *zhong*); fruits, *guo lei* 果類 (*juan* 31–2: 102 *zhong*), and trees, *mu lei* 木類 (*juan* 33–8: 272 *zhong*). In all, 1,714 *zhong* 種, kinds, are cited as entries.

In the *Zhi wu ming shi tu kao chang bian*, the ‘ornamental’ category does not appear and the order of the other categories is slightly different: grains, vegetables, mountain grasses, grasses of humid places, climbing grasses, fragrant grasses, water grasses, poisonous grasses, fruits, trees. In both cases one detects an underlying grand classic division between grasses, *cao* 草, on the one hand, for all the categories grouped together in the first thirty *juan*, and, on the other, trees, *mu* 木, for the last two categories, which occupy the last eight *juan* of the *Zhi wu ming shi tu kao*. As we can see, the author has taken over part of the categories of Li Shizhen but without adopting his hierarchies, for there is no mention of any superior category (the *bu* sections of Li Shizhen). The presence, for the first time, of the term *zhi wu* 植物 in the title of a work in Chinese devoted to plants is certainly not merely fortuitous. As we can see from the above analysis of the various parts, the author has associated plants from *materia medica* with others that are purely ornamental. In these circumstances, both the choice of *ben cao* and that of *qun fang* would have been incorrect. Writing *zhi wu* (‘planted thing’) rather than *cao mu* 草木 (grass-tree) to translate the notion of ‘plant’ seems to introduce a new perception of plant life, even if the author does not explain the reasons for his choice and, in the preface by the editor of the work, Lu Yinggu, only the term *cao mu* is used. These two collections clearly reveal the two aspects of Wu Qijun’s research. On the one hand, he carried out fieldwork. He made the most of his extensive travels as an administrative official to find out about the plants that he came across and even to draw some of them. These activities produced the *Zhi wu ming shi tu kao*. Meanwhile, on the other hand, he also compiled a large number of texts and the result of this work carried out in his study is to be found in the *Zhi wu ming shi tu kao chang bian*.

Let us begin with the non-illustrated second collection. The English subtitle of the 1915 edition translates the title as ‘Reading in Chinese Plants’. The text considers 838 names of plants,²³ and each of these entries includes citations of texts the combination of which forms a large volume that groups together extracts from works as diverse as collections of *materia medica*, agricultural and horticultural treatises and philosophical and poetic texts, providing information particularly about the descriptions and uses of plants. In the case of each entry this produces

²² Although *fang* is taken in its original sense of ‘fragrant plant’ to translate *fang lei*, here I interpret it in its sense of ‘beauty’, hence the translation of *qun fang*.

²³ Liang Jiamian (1980).

a sometimes dense collection of texts that needs to be considered meticulously on account of the ambiguities of traditional nomenclature. A single name may well designate a number of different plants while a single plant is sometimes referred to by a number of different names.²⁴ So it is not hard to understand the perplexity of many of the Western readers who assumed they were faced with a treatise on botany: a perplexity that is conveyed by the following comment:

Both the arrangement and organisation of the chapters of the *Zhi wu ming shi tu kao* are, to be sure, open to criticism. It cannot pass as a truly scientific treatise, for the botanical details are imprecise and incomplete, drowned in a mass of citations and legends, so that it is hard to pick out the history, characteristics, habitat and synonyms of each plant.²⁵

However, the intrinsic interest of the work, in particular the illustrated section, soon led foreign botanists to use it as a work of reference for Chinese botanical nomenclature. Thus, in 1888, Augustine Henry, in an article that lists 568 popular Chinese names of plants in the Yizhang region, systematically indicates the presence of these names in the *Zhi wu ming shi tu kao*, as well as referring to the *Ben cao gang mu*.²⁶ Elsewhere, the Japanese botanist Ono Motoyoshi 小野職愨 (1843–90) in 1883 began to edit a Japanese translation of the work, which was completed in the following year and for which the great botanist Ito Keisuke 伊藤圭介 (1803–1901) had written a preface in 1882.²⁷ Another Japanese botanist, Matsumura Jinzō 松村任三 (1856–1928), proposed a botanical identification of plants in his *Shokubutsu Mei-I* [改正増補] 植物名彙 (1895). Merrill and Walker (1938), for their part, announced that between 1912 and 1922 the Bureau of Plant Industry, US Department of Agriculture, had prepared a volume entitled *Indexes of the Great Chinese Botany Chih Wu Ming Shih T'u Kao*. More recently, works such as those of the botanist Chen Chongming have made it possible to produce botanical identifications that are more precise.²⁸

In its form, the *Zhi wu ming shi tu kao* remains a traditional text, as Joseph Needham pointed out: 'Though written at such a recent date, this splendid and well-illustrated treatise was entirely traditional in character and did not take any account of the advances in botany which had been made by Camerarius and Linnaeus'.²⁹ Nevertheless, compared to earlier literature, it introduced new elements and certainly presents the most original part of the botanic work of Wu Qijun, in comparison to the *Chang bian*. In the first place, it takes into consideration a quite vast geographical zone that he had been able to explore for himself. It cites around 400 names of plants in Jiangxi, as well as over 280 in Hunan and 370 in Yunnan.³⁰ Each of the 1,714 names of the cited plants is accompanied by at least one illustration and, even if the greater part of the corresponding text is made up of citations from earlier works, the author does add his own comments. The information, of

²⁴ Liang Jiamian (1980), Chen Chongming (1980).

²⁵ Liou-Ho and Roux (1927–8, 4, p. 15).

²⁶ Henry (1887).

²⁷ Ueno Masuzō (1973, p. 632).

²⁸ Chen Chongming (1981, 1984–5).

²⁹ SCC Volume 7, p. 30.

³⁰ Chen Chongming (1981, 1984–5).

unequal length, that is supplied for each of the plants relates to that plant's name; its geographical locations; its taste;³¹ its medicinal properties; its uses, morphology and ecology; and its cultivation and various kinds (*zhong*).³² The very title of the book, *Zhi wu ming shi tu kao* 植物名實圖考, which I translate literally as 'Researches into the names, realities and illustrations of plants', refers precisely to the author's principal concern. This is a study – or, as we might be tempted to say nowadays, a revision – of the Chinese botanic nomenclature by comparing the names, *ming* 名, with the reality of the objects, *shi* 實, and at the same time carrying out research, *kao* 考, on the illustrations, *tu* 圖. It was no doubt these preoccupations that prompted the author to seek first-hand information as well as written references, to support what he tells us. In *juan* 11, for example, under the entry *lan* 藍, we are told,

Li Shizhen divides it into five kinds (*zhong*) but in reality it is clear that this is very confused, for each one, both in its leaves and its flowers, differs from the others. Today the species best known to people are *liao lan* 蓼藍, *song lan* 荇藍 and *ma lan* 馬藍.

For Chen Chongming the plant designated by *lan* 藍 in the ancient texts is an indigo (*Isatis tinctoria* L. var *indigotica* Chao and Kuan), today known as *song lan*.³³ But as the two illustrations that accompany the text (Fig. 229) correspond to two other plants, the one to *liao lan*, a polygonum or knot-grass (*Polygonum tinctorium* Ait.), and the other to *ma lan* (*Baphicacanthus cusia* (Nees) Brem. (= *Strobilanthes cusia* (Nees) O. Kuntze)), he concludes that the author is mistaken. The fact is that the Chinese term *lan* is as ambiguous as its French or English homologue 'indigo' in that it covers a technological reality that may be expressed as 'plant that gives a dark blue dye' and certainly does not correspond to any precise botanical species. Actually, it seems that that is also Wu Qijun's understanding, to judge from the passage cited above, for he identifies *lan* with three different species. A similar case, that of *dian* 靛, has already been mentioned above. This concern to find the right terms for plants and the author's rigorous method of procedure are shown by the fact that he does not hesitate to raise problems of synonymy or homonymy if he himself has failed to resolve them and 'in this way, to facilitate the ongoing investigations of people in the future'.³⁴ The limitations that a botanist may discern both in texts and in illustrations show clearly that a 'botanical' reading is bound to reveal what will be seen to be inadequacies or failings from a scientific point of view, whereas an 'ethnobotanical' view enables one, on the contrary, to discern the originality of the contents.

In this respect, one remarkable feature is that here it is only plants that are considered, unlike in *ben cao* that are also concerned with minerals and animals. Now let us consider the nature of the entries. It must be pointed out that their number, 900 more than those in the *Chang bian*, speaks volumes. These new names

³¹ In the 'Five tastes' system (*wu wei* 五味), in accordance with the tradition of the *ben cao* 本草.

³² In some cases, *zhong* in fact designates botanical variety, species or even genus.

³³ Chen Chongming (1981, p. 136).

³⁴ Chen Chongming (1980). This author sets a good example with his suggestions for the botanical identification of certain plants. See Chen Chongming (1981; 1984–5).

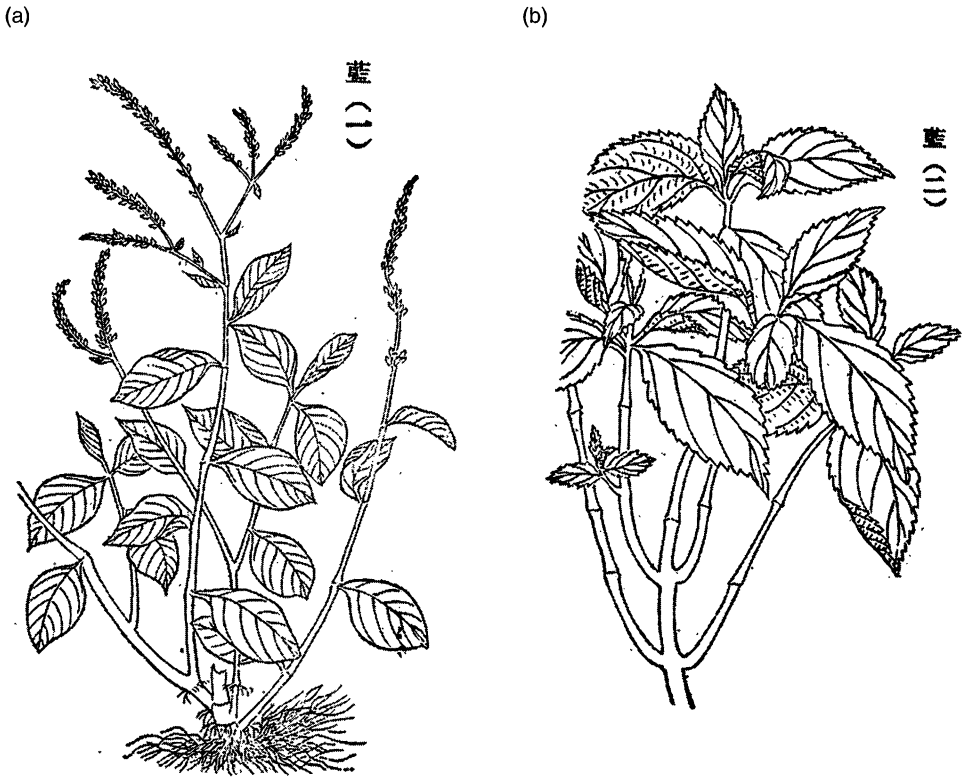


Fig. 229. Indigo (*lan* 藍). Two of the three *lan*, 'indigo', represented among *shi cao* 濕草, 'grasses of humid places', in *Zhi wu ming shi tu kao* (Wu Qijun, 1848, *juan* 11, pp. 12a, 12b): (a) *liao lan* 蓼藍 (*Polygonum tinctorium* Ait.); (b) *ma lan* 馬藍 (*Baphicacanthus cusia* (Nees) Brem.).

correspond to those of plants that were discovered by Wu Qijun in the course of his 'fieldwork' and his consultations with country people. The plants, both wild and cultivated, that are taken into consideration in the *Zhi wu ming shi tu kao* correspond to three very different categories:

- 1 The most numerous entries relate to plants that are known and identified. The author, relying on the documentation at his disposal as well as on his own experience, presents plants many of which are perfectly illustrated, such as maize,³⁵ broad bean and arrowroot (Fig. 230).³⁶ The accompanying texts are in the style of the descriptive notes to be found in certain *ben cao*, where particular importance is attributed to names – numerous synonyms are indicated – and to technological

³⁵ *Yu shu shu*, *Zea mays* L. See Wu Qijun (1974, p. 38).

³⁶ *Wu yu* (black taro) or *ci gu*: *Sagittaria sagittifolia* L., arrowroot; Jia Zuzhang and Jia Zushan (1955, Fig. 2096). See Wu Qijun (1974, p. 755).

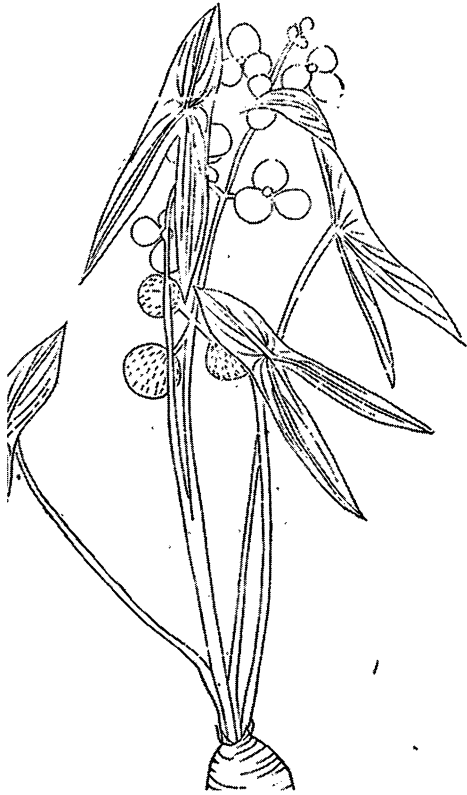


Fig. 230. Arrowroot (*wu yu* 烏芋, *Sagittaria sagittifolia* L.), another 'water fruit', represented in *Zhi wu ming shi tu kao* (Wu Qijun, 1848, *juan* 32, p. 30a).

uses, whereas in some cases there is no morphological description at all. In this first context, texts and illustrations are placed on two quite different, if complementary, levels that are not necessarily related. An illustration is not – as it is in modern floras – a complement to a diagnosis; often enough it constitutes the only information provided on the morphology of the plant under consideration.

- 2 Also cited as entries are the names of plants that are mentioned in ancient texts but the meaning of which the author has not been able to elucidate. He does not hesitate to mention the problems of identification posed by the plants named in ancient texts. For example, in *juan* 14, the category of grasses in humid places, he quotes *gou she cao* 狗舌草, then, in three successive entries, *di yang mei* 地楊梅, *zan cai* 鑿菜, and *you* 蓐, he emphasises the contradictions and inadequacies of the texts that are available, and reproduces the original illustrations, despite their mediocre quality, in order to encourage further research (Fig. 231).
- 3 The third case is particularly interesting as it concerns unknown plants. Wu Qijun introduces about a dozen plants knowledge of which was not attested in any text nor claimed in any local lore. He describes them, which would seem to



Fig. 231. *Gou she cao* 狗舌草, 'dog's tongue grass', one of the plants named and represented but not identified by the author of *Zhi wu ming shi tu kao* (Wu Qijun, 1848, *juan* 14, p. 23a).

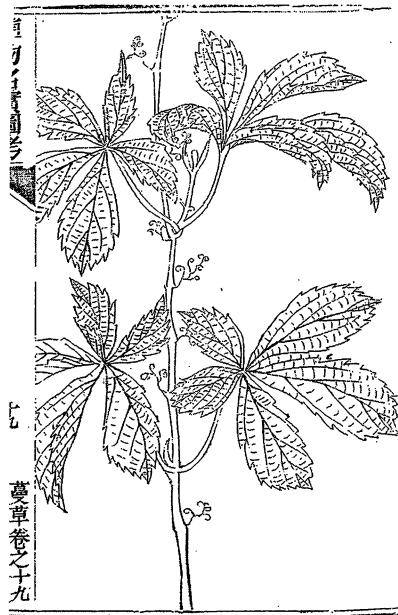


Fig. 232. Unnamed plant among the *man cao lei* 蔓草類, 'category of climbing grasses', *Zhi wu ming shi tu kao* (Wu Qijun, 1848, *juan* 19, p. 44a). One notices that on the left side of the page there is an empty space between the title of the book (top left) and the page number (middle left). Compare with Fig. 231 above.



图 3294 (葡萄科)

• 782 •

Fig. 233. *Wu lian mei* 烏莖莓 (*Cayratia japonica* (Thunb.) Gagnep.), in anon. (1972-6, Volume 2, p. 782).

testify to his purely botanic concerns, but he provides no name and, in the summary of the *juan* devoted to them, he even labels them 'nameless', *wu ming* 無名: an attitude quite incomprehensible to any modern botanist who would be only too happy to discover and name a new species. Let us see how he presents one of these 'anonymous' plants (Fig. 232), one of three kinds of liana that appear in *juan* 19,³⁷ which lists plants classified in 'the category of climbing grasses', *man cao lei* 蔓草類:

There are many in Jiangxi and in Hunan. Long stems with green skin, round knots as in bamboos. Small branches opposite the knots. Five leaves grow at the same time, like those of the *wu lian mei* 烏莖莓 [Fig. 233],^[38] but longer, split at the end, deeply jagged edges, thick pronounced veins like furrows. In between the knots, there are small hairs that cling to walls, like the feet of flies. Same category (*xiang lei* 相類) as *pa shan hu* 爬山虎 [a Virginia creeper] [Fig. 234].³⁹

Thanks to that last remark, even without giving the plant a name, he assigns it to a category, and that at least makes it possible to designate it 'a Virginia creeper'. We notice that this diagnosis associates, on the one hand, purely descriptive parts, in which technical or metaphorical terms are used, and, on the other, two analogical

³⁷ Wu Qijun (1974, p. 466).

³⁸ *Cayratia japonica* (Thunb.) Gagnep., in anon. (1972-6, Volume 2, p. 782).

³⁹ *Parthenocissus tricuspidata* (Sieb. et Zucc.) Planch., in anon. (1972-6, Volume 2, p. 775).



图 3280 《葡萄科》

• 775 •

Fig. 234. *Pa shan hu* 爬山虎 (*Parthenocissus tricuspidata* (Sieb. et Zucc.) Planch.), in anon. (1972–6, Volume 2, p. 775).

references to parts of other plants that are assumed to be known (Figs. 233 and 234). The graphic representation of the plant (Fig. 232) conveys useful information but, although it is realistic and carries a certain aesthetic interest, it cannot be called a botanical drawing, for the elements that are crucial for determining an identification (details of the flower and the fruit) are not present in the image. When put together, the information provided by both the text and the image certainly enables a botanist of today to produce hypotheses but does not make it possible for him to ‘determine’ the plant with certainty.

We can only conclude that even if Wu Qijun does operate as a botanist, his botany is not that of the Western botanists who are his contemporaries. While the object of research, plants, is common to them all, the point of view adopted is noticeably different. Scientific botanists are concerned with the plants as biological objects. For traditional botanists such as Wu Qijun or Cheng Yaotian,⁴⁰ plants are first and foremost cultural objects. Consequently, the name, use and history (earlier information such as illustrations, descriptions and so on) of a plant possess at least much importance as its biological reality. The few cases of plants that are ‘nameless’, *wu ming*, that appear in the *Zhi wu ming shi tu kao* indicate the radical difference between the two attitudes to nature. The great endeavour of scientific botanists from the 17th century, and particularly the 18th century, onward was to explore, list and *name* plants;⁴¹ that is to say, to attribute

⁴⁰ See pp. 228–36 above.

⁴¹ Already in the 16th century, Jacques Dalechamp, speaking of plants, wrote as follows in Chapter 1 of Book xiv (Dalechamp 1653, p. 318), ‘we must first try to know them all in general; then pick out those that can be traced to the description that the Ancients gave and to the names that they gave them. As for the others, which they left aside or did not know, we must describe them exactly and give them names that suit them’. It is clear that on this point Jacques Dalechamp, who, in other respects, is so close to Li Shizhen, takes a completely different line from him. For a comparison between the two, in particular regarding the classification of plants, see pp. 92–9 above and Métaillé (1989). In this process of scientific naming, most botanists chose to create names out of patronyms, thereby indicating their deference or friendship toward their colleagues; a few other botanists, such as Michel Adanson (1727–1806), instead favoured taking their vernacular names into account. Thus, for the genus of the tree today known in French and English as the ‘baobab’, he adopted the name ‘Baobab’, whereas Linnaeus dubbed that same genus *Adansonia*, which remains in use (Stafleu 1963, pp. 188–9). Clearly, for scientists too, the creation of a name is quite a symbolic undertaking.

to them a name which, de facto, confers upon them a precise place in a taxonomic system. Even if it is well known by indigenous populations, a plant discovered by a botanist will then be considered 'new to science' and will be renamed in accordance with the strict principles of the code of botanical nomenclature. That simple fact clearly reveals the gap between traditional knowledge – which is a priori placed outside the field of botanical science, and in which such plants as are cultivated are even disregarded by botanists – and scientific knowledge, which confers the status of a scientific object upon a natural object. For a traditional Chinese botanist scholar, on the contrary, the search for a plant seems to go hand in hand with reflection on the subject of its name, which is in many cases accompanied by conducting an enquiry among the inhabitants of the local countryside and woods. That was already the method noted by Zheng Qiao in his *Essay on Animals and Plants*, *Kun chong cao mu lue* 昆蟲草木略.⁴² As we have noted,⁴³ for Cheng Yaotian, that was even a major concern when it came to throwing light on the meaning of the obscure archaic names that determined his view of the plants. Wu Qijun, for his part, seems to have an equal interest in the names and in the plants themselves. He introduces a considerable number of plants from particular provinces, accompanying them with the names that his local informants bestow upon them, and he also gives an account of the local knowledge about these plants. In the cases of plants for which he can discover no name, he mentions the plants and describes them but leaves them anonymous. There seem to me to be two possible reasons for this. In imperial China, even as late as the 19th century, to bestow a name would no doubt have been deemed something too important for any member of the literati, even if he was a high-ranking official. As we have seen, in the case of the sunflower and that of the tomato, two centuries earlier, Zhao Han⁴⁴ 趙岫 noted that at the time when they were introduced, using seeds purchased by officials, at considerable cost, from foreign monks, they had no names. Once the seeds were sown in the imperial garden and plants had grown from them, it was the emperor who gave names to these new plants, calling them, respectively, *xiang ri ju* 向日菊, 'chrysanthemum that turns to the sun', and *xi hong shi* 西紅柿, 'red kaki from the West'. The second and perhaps more plausible possible reason is the influence of the trend of thinking to which Wu Qijun's work belongs, the *kao zheng xue* 考證學, 'evidential research movement'.⁴⁵ Belief in a partly lost ancient universal knowledge led to this way of looking at nature with a primordial interest not in its objects, but in the words used about it in archaic texts. For a scholar, nothing existed unless it had a name; that is to say, a name that dated from the Golden Age of antiquity. Consequently, an indigenous plant that was noticed but was not known by the people living in that environment must have had a name in the past. What needed to be done, then, was to rediscover its true name that had, in the course of time, been lost. As seen from

⁴² See Zheng Qiao (1995). ⁴³ See above, pp. 226–36. See also Métaillé (1992a).

⁴⁴ See p. 542–3 above.

⁴⁵ On this movement see Elman (1984).

this point of view, to confer a new name upon it would be wrong and the only logical solution was to leave it 'nameless' until such time as philological research had made it possible to identify the name in the ancient texts.

The case of these nameless plants seems to me crucial if we are to understand the irreducible difference between the botany of Wu Qijun and that of his botanist contemporaries. In that he described plants unknown to his predecessors, he seems to me closer to a botanical scientist than anyone else in Chinese history. At the same time, however, in that he did not wish or was not able to name those plants, he stands out as having an attitude radically different from that of a botanist. As I see it, this paradox confirms that the way to appreciate his work is not to compare it to modern biology. Its purpose was not that of a scientific work cataloguing and analysing living objects. In this respect, I do not think that there can be any 'fundamental continuity' between the botany of Wu Qijun and modern scientific botany, and, as I have said in my introduction, it seems to me that there can be no 'fusion' between traditional Chinese botany, best illustrated by Wu Qijun, and modern botany. In this respect, it has been recognised that botany as a specific science of plants never had appeared in China, even if the richness of knowledge about plants was appreciated. It is not possible to speak of 'the classification' of plants – let alone, obviously, of taxonomy – in the modern sense of the term. Even in the scholarly domain of *materia medica*, the various works that we have considered reflect different points of view, at the same time dividing plants up in accordance with a double canonical model formed by the combination of three pharmacodynamic grades (*san pin* 三品), associated with the five fundamental categories of Tao Hongjing: grasses and trees for wild plants; grains, vegetables and fruit trees for cultivated plants. In contrast, the work of Wu Qijun provides precious testimony of a different possible apprehension of plant life; and the 'universality' of this holistic approach to the relations that men have established and continue to establish with plants can perfectly well be understood and appreciated outside a Chinese context, without it being necessary to judge it by the yardstick of scientific botany. I hope readers can now understand why I chose to approach this study of the botanical knowledge of ancient China with the eye of an ethnobotanist. My aim has been to help them to appreciate how the plant environment in ancient China was perceived and used. In order to do that, since it was not possible to communicate with living informants, it has been through the written testimony that the latter have left us that I have tried to understand and explain the approach that doctors, cultivators, artists and so on may have adopted to the plant world. I have deliberately limited my research to a study of texts of a technical nature; so, to complete this particular view of mine and to move beyond it, I can only encourage those interested to read the chapter entitled 'Nature as Revelation' in *The Retreat of the Elephants*,⁴⁶ in which Mark Elvin, with a historical perspective, tackles the perception that the Chinese, thanks to the poetic dimension of their relationship with nature, had of their environment.

⁴⁶ See Elvin (2004, pp. 321–68).

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Song, +1197
Wu Renjie 吳仁傑
Modern edn 1965
- Li zhi pu* 荔枝譜
Treatise on the Litchi
Song, c.+1060
Cai Xiang 蔡襄
- Li zhi pu* 荔枝譜
Treatise on the Litchi
Ming, Wan Li era, 1573-1620
Xu Bo 徐勃
- Li zhi pu* 荔枝譜
Treatise on the Litchi
Ming, +1628
Deng Daoxie 鄧道協
- Linhai yi wu zhi* 臨海異物誌
Memoir on Strange Things at [the Commandery
of] Linhai

- Three Kingdoms
Shen Ying 沈瑩
Modern edn: Mou Qiyu and Qiu Zeqi (1990,
pp. 33-4)
Ling biao lu yi 嶺表錄異
Strange Phenomena Observed in Guangdong
Tang and Wu Dai, between c.+895 and +915
Liu Xun 劉恂
Ling wai dai da 嶺外代答
Information on What Is beyond the Passes
Song, +1178
Zhou Qufei 周去非
Liu qing ri zha 留青日札
Diary on Bamboo Tablets
Ming, +1579
Tian Yiheng 田藝衡
Liu shi ju pu 劉氏菊譜
Treatise on Chrysanthemums by Master Liu
Song, +1104
Liu Meng 劉蒙
Lü chan yan ben cao 履巉巖本草
Materia Medica of the Lüchanyan Mountains
Song, +1220
Wang Jie 王介
Cf Zheng Jinsheng (1989)
Lü shi chun qiu 呂氏春秋
Master Lü's Spring and Autumn Annals
Zhou (Qin), - 239
Written by a group of scholars assembled by Lu
Buwei 呂不韋
Modern edn: Lu Buwei (1989)
Lun yu 論語
Conversations and Discourses (of Confucius);
Analects
Zhou (Lu), c.-465 to -450
Compiled by disciples of Confucius (Chapters 16,
17, 18 and 20 are later interpolations)
Translation Legge (1969); Waley (1938); Ryckmans
(1987)
Luo fu huan zhi 羅浮幻質
Evocation of the Luofu Mountains. [Treatise on the
Painting of Japanese Apricot Blossom]
Ming, +1598
Zhou Lüjing 周履靖
In Zhou Lüjing, *Yi men guang du* 夷門廣牘
Luoyang hua mu ji 洛陽花木記
Records of the Ornamental Flowering Plants and
Trees of Luoyang
Song, +1082
Zhou Shihou 周師厚 (Zhou Xu 周絃)
In *Shuo fu*, *juan* 26, ed. Han Fen Lou
說郭, 涵芬樓
Luoyang ming yuan ji 洛陽名園記
Notes on the Famous Gardens of Luoyang
Northern Song, c.+1139
Li Gefei 李格非
In *Shuo fu*, *juan* 26, ed. Han Fen Lou 說郭, 涵芬樓
Luoyang mu dan ji 洛陽牡丹記
Notes on the Tree Peonies of Luoyang
Song, +1034
Ouyang Xiu 歐陽修
Mao shi cao mu niao shou chong yu shu 毛詩草木鳥獸蟲疏
An Elucidation of the Herbs, Trees, Birds,
Mammals, Small Beasts and Fishes in the Book
of Odes edited by Mao [Heng and Mao Chang]
San Guo (Wu), c.254
Lu Ji 陸璣
Mei hua xi shen pu 梅花喜神譜
Portraits of Japanese Apricot Blossom
Northern Song (+1231)
Song Boren 宋伯仁
Modern edn: Zhonghua shuju, Shanghai, 1928
Mei pu 梅譜
Treatise on the Japanese Apricot Tree
Song, +1186
Fan Chengda 范成大
Modern edn: anon. (1993), pp. 1-3
Meng qi bi tan 夢溪筆談
Dream Pool Essays
Song, +1086
Shen Gua 沈括
Modern edn: (1975), see Shen Gua and Hu Daojing
Ming yi bie lu 名醫別錄
Informal (or Additional) Records of Famous
Physicians (on *Materia Medica*)
Ascr. Liang, c.+510
Attrib. Tao Hongjing 陶弘景
Mo ke hui xi 墨客揮犀
Fly-Whisk Conversations of a Literary Person
Song, c.+1080
Peng Cheng 彭乘
Mu dan ba shu 牡丹八書
Eight Books on Tree Peonies
Ming, c.+1610
Xue Fengxiang 薛鳳翔
Mu dan pu 牡丹譜
Treatise on Tree Peonies
Song, 12th-13th centuries
Hu Yuanzhi 胡元質
Mu dan rong ju zhi 牡丹榮辱志
King's Daughters and Humble Handmaids;
A Classified Arrangement of (the Varieties of) the
Tree Peony (by Analogy with the Ranks of
Ladies Attending upon the Emperor)
Song, +1050
Qiu Xuan 邱璿
Nan fang cao mu zhuang 南房草木狀
Records of the Plants and Trees of the Southern
Regions
Song apocrypha attributed to Ji Han 嵇含, Jin, +304
Translation Li Huilin (1979)
Nan yue zhi 南越誌
Monograph on Southern Yue
Song, +465
Shen Huaiyuan 沈懷遠
Nan zhou yi wu zhi 南州異物誌
Notes on the Curiosities of Nanzhou
Wu, +3rd century
Wan Zhen 萬震
Modern edn: Mou Qiyu and Qiu Zeqi (1990, p. 7)
Nong sang ji yao 農桑輯要
Fundamentals of Agriculture and Sericulture

- Yuan, +1273
Preface by Wang Pan 王磐. Imperially commissioned and produced by the Board of Agriculture *Sì nong sì* 司農司
Modern edn: Shi Shenghan (1982)
- Nong sang yi shi cuo yao* 農桑衣食撮要
Selected Essentials of Agriculture, Sericulture, Clothing and Food
Yuan, +1314
Lu Mingshan 魯明善
Modern edn by Wang Yuhu; see Lu Mingshan (1962)
- Nong shu* 農書
Agricultural Treatise
Song, +1149
Chen Fu 陳敷
Modern edn: *Cong shu ji cheng qian bian*, Volume 451
- Nong shu* 農書
Agricultural Treatise
Yuan, +1313
Wang Zhen 王禎
Modern edn: Wang Yuhu (1981a)
- Nong zheng quan shu* 農政全書
Complete Treatise on Agricultural Administration
Ming, +1639
Xu Guangqi 徐光啓
Modern edn: Shi Shenghan (1979)
- Pan zhou ji* 盤洲記
Notes on the Plate Island
Northern Song, +1173
Hong Shi 洪適
Modern edn: Chen Zhi (1983, pp. 65–72)
- Pei hua ao jue lu* 培花奧決錄
Revelation of Secrets for Cultivating Flowers
Ming (preface 1634)
Sun Zhibo 孫知伯
- Pi ya* 埤雅
Additions to the Literary Expositor
Song, +1096
Lu Dian 陸佃
- Ping quan shan ju cao mu ji* 平泉山居草木記
Notes on the Plants of my Mountain Dwelling at Pingquan
Tang, c.+825
Li Deyu 李德裕
Modern edn: Chen Zhi (1983, pp. 14–16)
- Qi min yao shu* 齊民要術
Essential Techniques for the Peasantry
Northern Wei, c.+535
Jia Sixie 賈思勰
Modern edn with comm. Shi Shenghan (1957); Mou Qiyu (1982)
English partial translation Shih Shēng-han (1982);
Japanese translation (*juan* 1–9) by Nishiyama & Kumashiro, see Chia Ssu-Hsie (1969)
- Qi yuan xiao ying* 淇園杲影
[Treatise on Bamboos]
Ming, +1598
Zhou Lüjing 周履靖
In Zhou Lüjing, *Yi men guang du* 夷門廣牘
- Qing yi lu* 清異錄
Exhilarating Talks on Strange Things
Song, c.+965
Tao Gu 陶穀
- Quan fang bei zu* 全芳備祖
The Complete Chronicle of Fragrances (Thesaurus of Botanical Records)
Song, +1256
Chen Jingyi 陳景沂
Modern edn: 2 vols., Nongye chubanshe, Beijing, 1982
- Qun wu qi zhi* 群物奇制
Surprising Facts about Things
Ming, +1598
Zhou Lüjing 周履靖
In Zhou Lüjing, *Yi men guang du* 夷門廣牘
Facsimile edn: *Cong shu jicheng*, Shangwu yinshuguan, 1939
- Ri hua zi zhu jia ben cao* 日華子諸家本草
Master Ri Hua's Pharmacopoeia of All the Schools
Also known as *Da Ming ben cao* 大明本草
Pharmacopoeia of [Master] Da Ming
Song, c.+970
Da Ming 大明, alias Ri Huazi 日華子
- Ru cao bian* 茹草編
Monograph on the Consumption of Wild Plants
Ming, +1582, published in 1598
Zhou Lüjing 周履靖
In Zhou Lüjing, *Yi men guang du* 夷門廣牘
- Runan pu shi* 汝南圃史
A History of the Gardens of Runan
Ming, +1620
Zhou Wenhua 周文華
- Sai fu* 菜譜
Treatise on Vegetables
Edo, +1714
Kaibara Ekiken 貝原益軒
Modern edn: Yasaka shobō, Tokyo, 1973
- San cai tu hui* 三才圖繪
Universal Encyclopedia
Ming, +1609
Wang Qi 王圻 and Wang Siyi 王思義
Modern edn: Shanghai guji chubanshe, Shanghai, 1988
- Shan hai jing* 山海經
Itineraries through Mountains and Seas
Former Han
Compiled c.–1st century
Translation Birrell (1999)
Index, anon. (1948)
Cf Dorofeeva-Lichtmann (2007), Strassberg (2002)
- Shan jia qing gong* 山家清供
Simple Foods of a Mountain Man
Southern Song, c.+1241–52
Lin Hong 林洪
Cf Sabban (1997)
- Shan ju si yao* 山居四要
The Four Necessities for a Dwelling in the Mountains
Yuan, +1360
Wang Rumao 王汝懋
Shang shu 尚書
Cf *Shu jing* 書經

Shao xing ben cao 紹興本草

Cf *Shao Xing xiao ding jing shi zheng lei bei ji ben cao* 紹興校訂經史證類備記本草

Shao Xing xiao ding jing shi zheng lei bei ji ben cao 紹興校訂經史證類備記本草

The Correct Classified and Consolidated Armamentarium; Pharmacopoeia of the Shaoxing Reign Period

Song, +1159

Tang Shenwei 唐慎微

Ed. Wang Jixian 王繼先 et al.

Facsimile edn: Okanishi Tameto (1971)

Shen nong ben cao jing 神農本草經

Classical Pharmacopoeia of the Heavenly Husbandman

Former Han, based on Zhou and Qin material, but not reaching its final form before the +2nd century

Writers unknown

Lost as a separate work but reconstituted and annotated by numerous scholars

Shen nong ben cao jing jizhu 神農本草經集注

Collected Commentaries on the *Shen nong ben cao jing*

(late 6th century)

Tao Hongjing 陶弘景

Modern edn: Tao Hongjing (1955)

Shen nong shu 神農書

The Book of Shen Nong

Partially reconstituted by Ma Guohan, cf *YHSF*, *juan* 69, pp. 2a–7a

Shi ji 史記

Historical Records (until –99)

Former Han, c.–90

Sima Qian 司馬遷 and Sima Tan 司馬談

Modern edn: Sima Qian (1972)

See Hulswé (1993) for a complete review of the book and its translations

Shi jing 詩經

Book of Odes

Zhou, –11th to –7th century (Dobson's dating)

Writers and compilers unknown

Translation Legge (1991), Waley (1937), Karlgren (1950), Couvreur (1896), Granet (1919)

Shi lin guang ji 事林廣記

Compilation of All Things

Northern Song or Yuan, c.+1270

Chen Yuanjing 陳元靚

Modern edn (1990) Shanghai guji chubanshe, Shanghai

Shi pin ji 食品集

A Collection of Foodstuffs

Ming, +1556 (preface)

Wu Lu 吳祿

Modern edn (n.d.) Zhonguo shudian, Peking

Shi shi ju pu 史氏菊譜

Master Shi's Treatise on Chrysanthemums

Song, +1175

Shi Zhengzhi 史正志

Shi shuo xin yu 世說新語

New Discourse on the Talk of the Times

[notes on minor incidents from Han to Jin]

Late Song, c.+mid-5th century

Liu Yiqing 劉義慶

Commentary by Liu Xiaobiao 劉孝標 (Liang)

Trad. Mather (2002)

Shi wu ben cao 食物本草

Nutritional Natural History

Under this title there are several works by different authors. Published between 1573 and 1619, *Shi wu ben cao* by Lu He 盧和 has four (or two) *juan*. Its content is identical to that of *juan* 3 and 4 of *Ben cao yao yan* 本草藥言 by Bi Ji 薛己. In 1620 another work was published with the same title in seven *juan* composed by Wang Ying 汪穎. The most important of these works, completed after 1641, is the following: on the basis of a compilation made by Li Gao 李杲 during the Yuan dynasty, Li Shizhen revised and completed a text that was then enlarged and edited by Yao Kecheng 姚可成 after 1641 (anon. 1981, p. 185). For a recent edition, cf Li Gao, Li Shizhen and Yao Kecheng (1990)

Shi yi ji 拾遺記

Notes on Forgotten Facts

Han, between +168 and 189

Wang Jia 王嘉

Text in *Shuo fu san zhong* 說浮三種, Volume 1, pp. 519–23. Shanghai guji chubanshe

Shanghai (1st edn 1935)

Shin kōsei Honzō kōmoku 新校正本草綱目

Ben cao gang mu newly revised

+1714

Inō Jakusui 稻若水 (or 稻生若水)

This edition is enlarged with additional illustrations in four *juan*, titled *Honzō zu yoku* 本草圖翼 (Illustrated Wings of *Materia Medica*), and with a treatise by Inō Jakusui, Keppōkyo besshū 結髦居別集

Shokugaku keigen 植學啓原

An Introduction to Botany

Edo, +1834

Udagawa Yōan 宇田川榕菴

Shokugaku yakusen 植學譯筌

An English–Japanese Dictionary of Botany

Edo, +1874

Ono Motoyoshi 小野職懿

Shokumotsu denshin san 食物傳信纂

Compilation of Knowledge on Foodstuffs

+1695

Inō Jakusui 稻若水

Shou butsu rui san 庶物類纂

Compilation of Things by Category

Edo, 1747

Ino Jakusui 稻生若水 and Niwa Shōhaku 丹羽正伯

Shou shi tong kao 授時通考

A Compendium of Works and Days

Qing, +1742

Hu-Er-Tai 鄔爾泰

Modern edn: Nongye chubanshe, Beijing, 1956;

also Ma Zongshen and Jiang Yian (1991), Nongye chubanshe

- Shu ben cao* 蜀本草
Pharmacopoeia of the State of Shu [Sichuan]
Also called *Chong guang ying gong ben cao* 重廣英公本草
New Enlarged Pharmacopoeia of the Duke Ying
Late Jin, between +938 and 950
Han Baosheng 韓保升
- Shu jing* 書經 or *Shang shu* 尚書
Historical Classic [or Book of Documents]
Han
Writers unknown
See Shaughnessy (1993)
Translation Legge (1879); Couvreur (1935)
- Shuo fu* 說卦
Yuan/Ming, c.+1368
Tao Zongyi 陶宗儀
Editions: Yuan wei shan tang 宛委山堂 (+1647)
Han Fen Lou 涵芬樓, modern edn: Shangwu, Shanghai, 1927
- Shuo wen jie zi* 說文解字
Analytical Dictionary of Characters (lit.
Explanations of Simple Characters and Analysis
of Composite Ones)
Late Han, +121
Xu Shen 許慎
See Ding Fubao (1928); Boltz (1993); Bottero (1996)
- Si ku quan shu zong mu* 四庫全書總目
Annotated Catalogue of the Complete Collection of
the Four Treasuries
Qing, 1782
Yong Rong et al. 永瑢等撰
Modern edn: 2 vols., Zhonghua shuju, Beijing, 1983
- Si min yue ling* 四民月令
Monthly Ordinances for the Four Sorts of People
Late Han, c.+160
Cui Shi 崔寔
- Si shi zuan yao* 四時纂要
Important Rules for the Four Seasons
Tang/Five Dynasties, early 10th century
Han E 韓鄂
Modern edn: Mou Qiye (1981b)
Japanese translation see Watabe Takeshi (1982)
- Sima wengong ji* 司馬溫公集
Collected Works by Sima Guang
Song
Sima Guang 司馬光
In *Si bu bei yao: Ji pu* (1881) Zhonghua shuju, Shanghai
- Song yuan xue an* 宋元學案
Schools of Philosophers in the Song and Yuan
Dynasties
Qing, c.+1750
Huang Zongxi 黃宗羲 著; Quan Zuwang 全祖望
- Song zhai mei pu* 松齋梅譜
The Pinetree Studio Treatise on the Japanese
Apricot
Ming, +1351
Wu Taisu 吳太素
- Sun pu* 筍譜
Treatise on Bamboo Shoots
Song, +970
- Attributed to the monk Zan Ning 贊寧 (d. 996), or
to Hui Chong 惠崇 (10th century)
- Tai ping yu lan* 太平御覽
Tai
Song +983
Ed. Li Fang 李昉
- Tai shang ling bao zhi cao pin* 太上靈寶芝草品
Catalogue of *Zhi* Herbs of the Sacred Treasure
of the Highest One
Song
Author unknown
In *Dao zang* (1988, Volume 34, pp. 316–37)
- Tai yi xian zhi ben cao yao xing da quan* 太乙仙制本草藥性
大全
Compendium on the Nature of the *Materia Medica*
of the Geniuses of the Supreme Height
Ming, between 1565 and 1582
Wang Wenjie 王文洁
Facsimile edn 1582: (2001) Zhong yi guji chubanshe, Beijing
- Taisei honzō meisō* 泰西本草名疏
Nomenclature of the Plants of the Extreme
Occident
Edo, +1829
Itō Keisuke 伊藤圭介
- Tang ben cao*
See *Xin xiu ben cao*
- Tang hui yao* 唐會要
History of the Administrative Statutes of the
Tang Dynasty
Song, +961
Wang Pu 王溥
- Tang yu lin* 唐語林
Tang Florilegium
Song, early 12th century
Wang Dang 王讜
- Tang yun* 唐韻
Tang Dictionary of Characters Arranged
According to Their Sounds
Tang, +751
Sun Mian 孫愐
First state +677 by Changsun Nuo Yan
長孫諾言
Now extant only within the *Guang yun*
- Tashiki-hen* 多識編
The State of Knowledge
Edo, +1612
- Tashiki-hen* 多識編
Dōshun 道春 [Hayashi Razan 林羅山]
- Tian gong kai wu* 天工開物
The Use of the Works of Nature
Ming, +1637
Song Yingxing 宋應星
Modern edn: Pan Jixing (1989); Song
Yingxing (1978)
- Tianpeng mu dan pu* 天彭牡丹譜
Treatise on Tree Peonies of Tianpeng
Song, +1178
Lu You 陸游
- Tong jun yao lu* 桐君藥錄
Treatise on Medicinal Herbs by Tong

- This work, now lost, is mentioned in the bibliographies of Sui Shu. Its putative author was supposedly a minister of Huang Di and is attributed with the establishment of three grades of *san pin* within which drugs were first catalogued (cf Ma Jixing et al. 1981, p. 203; Fang Binguan et al. 1933, p. 809)
- Tong pu* 桐譜
Treatise on *tong* Trees
Song, c.+1050
Chen Zhu 陳翥
Modern edn: Pan Falian (1981)
- Tong yi lu* 通藝錄
Notes on All the Arts
Qing, preface +1804
Cheng Yaotian 程瑤田
- Tong zhi* 通志
Historical Collections
Song, c.+1150
Zheng Qiao 鄭樵
- Wamyō ruijushō* 倭名類聚抄
Compilation of Japanese Words by Category
Edo, c.+931–8
Minamoto no Shitagō 源順
- Wei wang hua mu zhi* 魏王花木志
A Book of Flowers and Trees by Prince [Xin, of Guangling, of the Northern] Wei [Dynasty]
Northern Wei, between +480 and 535
Thopa Xin 拓跋欣, or one of his secretaries
- Wu lei xiang gan zhi* 物類相感志
Resonance between the Categories of Things
Song, c.+980
Attributed to Su Shi 蘇軾
Probable author: Lu Zanning 錄贊寧
- Wu li xiao shi* 物理小識
Small Encyclopaedia of the Principles of Things
Qing, 1664
Fang Yizhi 方以知
Facsimile edn: Fang Yizhi (1995)
- Wu pu ben cao* 吳普本草
Pharmacopoeia of [Master] Wu Pu
Three Kingdoms, Wei, c.+225
Wu Pu 吳普
- Wu xing da yi* 五行大義
The Compendium of the Five Agents
Sui, +600
Xiao Qj 蕭吉
Modern edn: Wang Yunwu 王雲五 (1939); Nakamura Shōhachi 中村璋八 (1990)
Translation and commentary Kalinowski (1991)
- Wu xun pu* 吳萇譜
Treatise on the Mushrooms of the Lower Yangzi
Qing, c.1700
Wu Lin 吳林
- Wu yi shuo* 五宜說
On the Five Agreements
Five Dynasties
Han Xizai 韓熙載 (902–70)
- Xi jing za ji* 西京雜記
Miscellaneous Records of the Western Capital
Liang, or Chen, mid-+6th century
Ge Hong 葛洪
Modern edn (1999)
- Xian bei ji* 陷北記
Records of the North Five Dynasties
Hu Jiao 胡嶠
Modern edn: Wu Zengqi (1930, Volume 9, pp. 2–4)
- Xian qing ou ji* 閑情偶記
Scattered Notes from Idle Moods
Qing, c.+1671
Li Yu 李漁
Modern edn: Hangzhou (1985); Yangzhou (1991)
Partial French translation Dars (2003)
- Xiao Shan hua pu* 小山畫譜
Treatise on Painting by Xiao Shan
Qing, +1740
Zou Yigui 鄒一桂
- Xin an zhi* 新安志
Local Monograph on the History of the Prefecture of Huizhou in Southern Anhui
Song, +1175
Luo Yuan 羅願
- Xin xiu ben cao* 新修本草
Newly Revised Pharmacopoeia
Tang, +659
Su Jing 蘇敬
- Xu bo wu zhi* 續博物志
Continuation of the Compendium of Extensive Knowledge [by Zhang Hua]
Song, mid +12th century
Li Shi 李石
Modern edn: Li Shi (1991)
- Xue pu za shu* 學圃雜疏
Various Remarks on the Study of Gardening
Ming, +1587
Wang Shimao 王世懋
Modern edn: anon. (1993a, pp. 314–24)
- Xun zi* 荀子
The Book of Master Xun
Zhou, c. – 240
Xun Qing 荀卿
Modern edn: Zhang Shitong (1974)
- Yamato honzō* 大和本 草
The Natural History of Japan
Edo, 1709
Kaibara Ekiken 貝原益軒
Modern edn: Shirai (1975)
- Yan fan lu* 演繁露
Playing with the Trimming of One's Cap
Song, second half of the 12th century
Cheng Dachang 程大昌
- Yangzhou shao yao pu* 揚州芍藥譜
Treatise on the Herbaceous Peonies of Yangzhou
Song, +1075
Wang Guan 王觀
- Ye cai bo lu* 野菜博錄
Comprehensive Account of Edible Wild Plants
Ming, +1622
Bao Shan 鮑山
- Yi jian zhi* 夷堅志
Monograph of Strange and Veracious [Things]

- Song, c.1200
 Hong Mai 洪邁
Yi li 儀禮
 Ceremonial
 Former Han
 See presentation of the work in Boltz (1993)
- Yi men guang du* 夷門廣牘
 Tablets from the Gate of Silence
 Ming, +1598
 Zhou Lüjing 周履靖
- Yi wen lei ju* 藝文類聚
 Art and Literature Collected and Classified
 [Encyclopedia]
 Tang, c.+640
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 +1713
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guan ben cao 經史證類大觀本草; *Shao Xing xiao*
ding jing shi zheng lei bei ji ben cao 紹興校訂經史證
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 Date unknown. An ‘enlarged and corrected’ re-
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 Appreciation of Plants
 Ming, +1617
 Zhao Han 趙崐
- Zhi zhai shu lu jie ti* 直齋書錄解題
 A Bibliography of Zhi Pavilion
 Southern Song, +1238
 Chen Zhensun 陳振孫
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